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FOOD INDUSTRIES

PRODUCTION . ENGINEERING . DISTRIBUTION

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FOOD INDUSTRIES

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PRODUCTION • ENGINEERING • DISTRIBUTION

NEW YORK, OCTOBER, 1933

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Laurence V. Burton, Editor

High-Cost Methods Have Got to Go

ANYBODY'S OLD CLOTHES can be made to last one day or a week longer—that is, if he doesn't care a hoot about how rotten he looks.

Take the lowliest bum who panhandles for the proverbial "cup of coffee" and place him in the midst of a swank evening affair, surrounded by perfectly groomed women and men in open-face suits. How long would he last in that environment? Yet he is adequately dressed, in the sense that he is not indulging in what is legally termed indecent exposure.

Ask yourself if you would ever go out to any kind of a business luncheon or a banquet dressed in old clothes, or even good clothes that needed pressing or a shirt and collar that should have gone to the ragbag long ago, even though their frayed edges be laundered white.

And now, ask yourself why you wouldn't do it. It's dollars to doughnuts that you wouldn't do it because you would feel out of place.

Why would you be out of place? And, furthermore, why should you care if you were out of place?

Just ponder that line of reasoning for a while and see if you don't arrive at the conclusion that you dress up when you go places so that you will be in the position to compete *socially*. This conclusion is inevitable despite the fact that the old clothes are still good for another round trip and that you will not be arrested for wearing them.

We keep up our personal attire in order to compete *socially*. There is a striking parallel in the many presumably good business men who would try to do business with plants that are not equipped to compete *economically*.

You don't believe it? Then study some of the codes and agreements that have recently been submitted to A.A.A. and N.R.A. Read those sections that try to forbid the purchase of any new equipment; codes that try to prohibit modernization. If that is not the economic equivalent of wearing overalls at a banquet, then we will wear our favorite tattered pair of baggy old trousers at the next formal function we attend.

When presumably intelligent business executives write into a code agreement, which, if approved becomes law, that there shall be no new equipment purchased in the next two years, they have written an unconscious indictment of their own faulty powers of perception and a confession of inability to lead their industries.

TO COMPETE in business in the next two years is going to require all the brains and resourcefulness that industry can muster to its command. And any industry or any plant that tries to compete with outmoded equipment will last relatively about as long as the proverbial snowball.

Of course, if *production* is all you need—if the manufacture of a product is the sole aim of your

life—go ahead, have fun. Most concerns, however, are in business for profits, not products.

No more severe indictment of the low morale of American business today need be drawn than to point to the constant effort on the part of leaders of industry to perpetuate high-cost manufacturing operations via the code route.

Of course, the old plant or the old machine will run for another year! Who says it won't? Not we. We have never seen a plant yet where a product could not be manufactured somehow—for a while. But when the money gives out it has to stop.

High-cost manufacture has got to go. The New Deal, whether you like it or not, is here. It is real. And it will require low-cost manufacture in order to survive. The high-cost idea is so absurd that it is hard to believe that the leaders of business have actually proposed it.

To be legally bound to high-cost manufacture is to be chained to the past just as certainly as debts are a chain to the past. If you want to try to do business in 1934 with old high-cost methods be sure to ask your treasurer how long he can finance your operations while you are continuing to wear the equivalent of old clothes. They probably will last as long as you want to give things away. After that: Finis!

As It Looks To Us

Unexpected? . . .

The New Deal, Codes, P.R.A., *et al* are having some very unexpected results—that is, they are unexpected to the gentlemen in Washington who proposed them. One of the troubles of many industries is too great producing capacity. To meet this situation, the N.R.A. plan has proposed shorter working hours.

And now many of the larger concerns are *buying additional equipment* in order to produce in the shorter hours the volume which they can sell and are selling. And thus overcapacity of the industry becomes still larger. The additional equipment is largely packing and packaging lines.

Opportunity . . .

Of course, we may be somewhat premature in our judgment, yet we opine that the proposed revision of the Food and Drug Laws will compel the introduction of technical control into some branches of the food industries which heretofore have succeeded in spite of methods that—well, charitably speaking, are only so-so.

The drying of certain fruits which requires sulphur dioxide treatment to prevent their discoloration will need control of sulphuring. Will the equipment industry be ready with a cheap, foolproof process that can be operated by farm or ranch help?

Wrong Reasons . . .

"People always buy it for the wrong reason," said a very successful sales executive recently. His words should not be mistaken to mean something which they do not. In buying there is, of course, the inevitable logical reason—a need to be filled—but why that need is filled by other fellows' brands instead of yours is based not on logic but illogic.

The final argument with oneself, the reason with which we kid ourselves into making the choice we do, usually is wrong as far as logic is concerned. The purchase probably is right, but the reason we give to ourselves is emotional rather than rational.

Food manufacturers should ponder the idea of the wrong reasons for buying.

Perfect Code . . .

The perfect code has been defined as "One which raises my prices and puts all my competitors out of business."

Inter-Industry Agreements Needed . . .

Today the really violent competition is the little suspected competition between whole industries, not between the individual companies in an industry. In fuels, the dominating factor is the war between gas and oil and coal. In building materials, it is the competition between brick and concrete and lumber that is important. In textiles, it is largely the relative prices of cotton and wool and silk and rayon that determine the consumers' choice.

In foods, it is the type of competition between beef and pork and eggs and fish, or that which is exemplified by macaroni, bread and potatoes, or by canned and fresh vegetables, which renders it wellnigh impossible to solve the problems of the individual concern without also solving the problems of whole competing industries.

Codes and agreements may help a little, but the real problem is still to be solved.

Terrible . . .

All efficient and prosperous plants of which we have any knowledge are orderly, neat and clean—quite in contrast to a plant we recently visited.

Visitors or no visitors, we fail to comprehend how anyone in authority can stand it to wade through and over the disorder that prevails in that plant from the front door to the stockroom.

The only excuse for disorder in a plant arises during alterations or repairs.

The Sales Manager's *Dream* Became the Production Manager's *Nightmare*

By WALTER K. HINES
Manager of Operating Division
Sun-Maid Raisin Growers' Association
Fresno, Calif.

ONE MAN'S dream is another man's nightmare, and when the sales manager "solves a problem," the production manager's troubles usually have begun. This particular problem was getting greater distribution and volume for a quality raisin pack in the rural markets of the Middle West. Housewives in this area, because of their larger cooking requirements, customarily purchase 2- or 4-lb. bag units instead of the 15-oz. cartons which are elsewhere most popular. This style of package had become largely a "bargain offering," in which quality was largely subordinated to price.

We believed, despite evidence to the contrary, that the country housewife was just as good a judge of quality as any other. If she had an opportunity to purchase fine raisins in the size unit she preferred, it was our opinion that she would buy them. However, she is a shrewd, cautious buyer, and it was obvious that in offering her superior raisins we would have to do so in a manner that would clearly demonstrate that superiority.

This meant that an attractive container, which would adequately display the fruit, was essential. In view of its current popularity, Cellophane immediately suggested itself. Unfortunately, however, four years of experimenting with this type of packing material had achieved far from successful results. Raisins scratched the bag, surface moisture wrinkled the Cellophane, or the sugars drying and crystallizing on the Cellophane after a short time in storage produced a spotted, clouded and unattractive container. To the average consumer such a package was "spoiled," and it was, in consequence, thoroughly unsatisfactory.

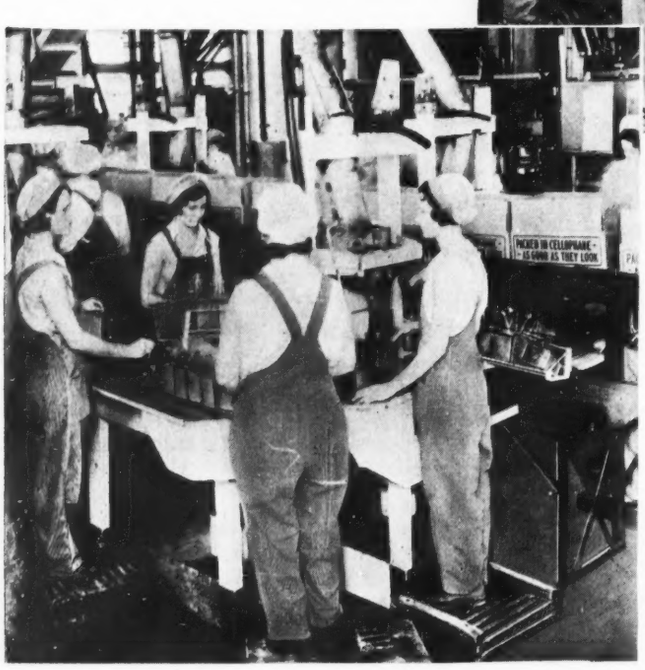
Sun-Maid, however, markets two specialty products—Nectars and Puffed—which, by an exclusive manufacturing process, are "jelled inside and sealed outside." Fruit manufactured in this manner has smoother, glossier skins, which are more pliable and more tender than those of ordinary raisins. It was found that these would carry in Cellophane without any of the insurmountable obstacles presented by other types of fruit.

Scratching was eliminated and the processing of the fruit was such that the grape sugars were protected from direct contact with the bag itself. Subsequent attempts of others in the industry to pack ordinary raisins in plain, transparent cellulose have proved the impossibility of this procedure. The type of product suitable for the Cellophane package was, fortunately, the best quality we offer. With the product defined, the sales manager's dream was realized, but the production manager's nightmare had begun.

Experimental small runs were made and test shipments completed. While this is helpful, there is only one way to schedule efficiently a manufacturing operation, and that is to manufacture. This we prepared to

do with our first attention directed to the bag itself and to shipping containers. A clean-cut bag with good, sharp display was desired. Loosely packed bags, round bundles, every conceivable type of package was presented and considered. A compact, square, tightly packed bag not only was most attractive in appearance but was best adapted to existing packing equipment.

In designing and printing this bag we met our next difficulty. Transparency was an essential characteristic, yet the arrangement of trademark, brand name and essential text promised to cover the entire face of the carton. The dark background of the raisins tended further to reduce the visibility of this necessary material. However, a satisfactory design was finally obtained, and, by using four bright colors, we obtained a package which we believe to be as attractive as any in the grocery field.



As the first orders came in, plant crews took their places dubiously. They had packed paper bags for years, but this was something else.

While experimental runs are helpful, there is only one way to schedule an efficient manufacturing operation, and that is to manufacture.

The type of the shipping container, our next consideration, brought us again to the sharpness of the edges of the individual package. This factor involved the retention of sharpness in filling the shipping container and devising means to remove the packages from the container without disturbing its original form. This first necessitated a complete redesign of the shipping container, as it was found in experimental shipments that any appreciable play between layers would break down the original form and tend to fog the individual package. But in accomplishing this snugness of fit, we automatically created a condition that made difficult the removal of the packages from the shipping container by the retail trade. This particular phase had not troubled us in our paper-bag or carton packs.

Our investigation developed the fact that manufacturers along other lines had met with and overcome this same difficulty, so that our solution was not in the strict sense an innovation. As the last package is placed in each layer, a piece of newswrap is held around the package, the ends of which are allowed to extend above the surface of the layer. The second layer is placed and the operation repeated. When the case is opened, the retailer merely takes hold of the ends of the newswrap and lifts out the package. Once the opening is created, the remainder of the packages can be taken out with no inconvenience.

We were now ready to manufacture, and the new product was offered on a test basis in a limited number of Mid-Western territories. Conservative packing-material orders were placed and limited schedules built, while the sales manager, by this time growing impatient, went to work. Plant crews, as the first orders came in, took their places dubiously. They had packed paper bags for years, but this was something else. Close supervision was essential and changes in procedure had to be made as their advisability appeared.

Opening, filling and sealing the bags were matters that required considerable experimentation, but our experience as the originators of the paper-bag packs of raisins enabled us to solve the difficulties encountered in this regard.

The snapping open of the bag,

which is a common and practical procedure in the opening of paper bags, was found to injure the Cellophane bag under certain temperatures. Experiments showed that preheating was the solution to this vexing problem, with the result that we were able to continue with existing packing procedure. This discovery was most important, as otherwise it might have been necessary to replan our production flow, with the incident expense and probable reduction in capacity.

Similarly, the filling of the Cellophane bag had limitations that were not common to the paper bags. In order that the open end might be squared and folded, so as to present the same appearance as the factory sealed end, it was necessary that the amount of fold be limited. Semi-automatic air-pressing of the raisins was resorted to, as against the prior practice of manual pressing. This was found to be the method that would permit the filling of the bags with the required weight within the limits of the amount of material allowable for proper folding.

Sealing the bag in the course of our regular packing procedure was at first of considerable concern, but eventually resolved itself into a matter of adaptation to handling a new material and proper layout of gluing and sealing equipment. Under our paper-bag-packing procedure, sealing was merely a matter of placing a streak of glue across the fold. With Cellophane it was a matter of careful folding and definite application of the glue to certain parts of the fold.

At first, wastage seemed to be a big factor in the ultimate success of Cellophane from an operating point of view, but our preheating practice reduced this factor to a very low figure. In large-scale production, the wastage item has been no more than was formerly experienced with paper bags.

Transparency was an essential characteristic of the new package, but to preserve it and still retain the brand name, trademark and other necessary text was a difficult problem of design.

Another important factor that enters largely into the matter of sales, and appeals alike to the quality manufacturer and consumer, is the absolute necessity for maintenance of quality and cleanliness standards, which in turn are repaid by consumer preference. Sun-Maid has always been the leader in the industry in this regard, and we are particularly pleased with this aspect of Cellophane, as heretofore we had to rely upon the printed word to convey these facts.

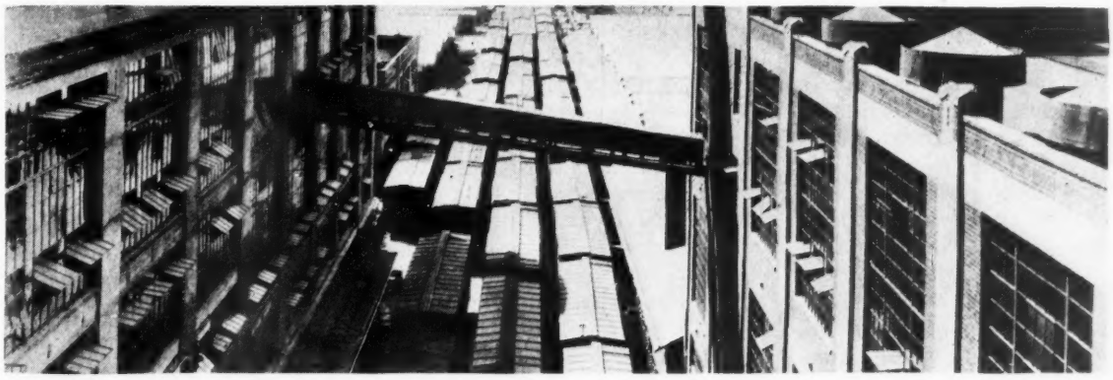
Production procedure is practically identical with the paper-bag operation. Quantity production and production costs are practically in line with paper-bag operations, and it is highly probable that the Cellophane pack will eventually be brought entirely into automatic machine operation.

The sales department had announced that it was going to send off the new product with a bang. When these "bangs" actually occur the explosion usually is made directly under the feet of the operating division. Broadsides were sent the retail trade, display material was distributed, sales representatives were pepped up. On the morning following the first offering, an order for a straight car from Duluth came in. This we felt would give us an opportunity to try ourselves out. It did. And so did contracts from the entire Middle West, which, in three days, exhausted the packing-material supplies we had planned for a six-week period! New supplies were ordered and rushed to us.

In this first week, 100 per cent distribution was obtained in such points as Des Moines and Sioux City. Distributors who had been on the inactive list for from one to three seasons placed orders, and apparently the entire Mid-Western area had but one thing in mind and that was to buy more Sun-Maid Nectars and Puffed in Cellophane—and get them right now. The sales manager walked around with a smile on his face and the production manager ran around with his hands in the air.

Frankly, in the last few years we hadn't been used to so much excitement. Crews were trained, supplies were delivered, countless changes in procedure were made and we found out that *capacity production* was a phrase still in the language. The pack went over, and the production department almost went under, but came up again to swim its way out. The nice thing about nightmares is that when you wake up they are not as bad as they seemed.

We found that capacity production was a phrase still in the language.



Queer Things

That Happen in

MIXING

By LAURENCE V. BURTON
Editor, Food Industries

MIXING is very simple until one begins to learn something about its details. After that it begins to look like a job worthy of careful study. And when it is discovered that running a mixer can partially undo a mixing job on some types of materials, that a mixer can unmix at times, that mixing machines have very characteristic performances, then it becomes apparent that, as a unit operation, mixing is anything but simple.

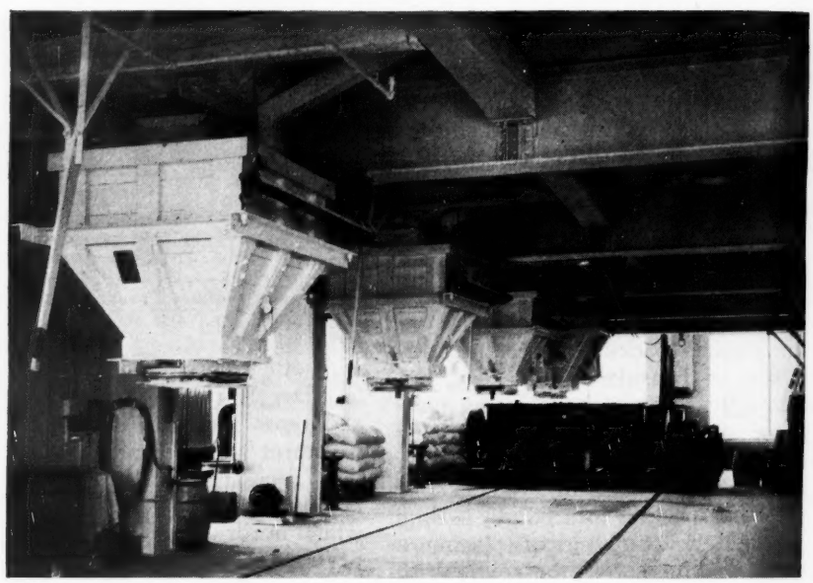
Nearly every branch of food manufacture utilizes mixing as a method somewhere in its operations. In this discussion, only the mixing of dry solids is considered. The easier jobs, such as the mixing of solids which are identical, as found in the blending of flour, or coffee beans or cocoa beans, are also omitted.

The really complicated mixing jobs are found where the dry substances to be mixed are granular materials, dissimilar in one or more respects, such as the following:

Cocoa powder, starch and sugar
Flour and salt
Flour, salt and sugar
Flour, salt, paprika and sugar
Starch, bicarbonate of soda, monocalcium phosphate and egg albumen
Powdered milk and sugar
Raisins, currants, chopped apples, suet and spices
Cocoa powder and malted milk
Gelatin and sugar
Blends of powdered spices, curry powders, and similar materials
Shortening and flour (the last item also comes in this category of difficult mixing, although shortening is not exactly a dry substance in the sense used here).

In each of these mixtures, the various ingredients differ in density and particle size; and in a few, such as the baking-powder mixture, some of the individual granular ingredients are present in two or more definitely distinct particle sizes. These differences of density and size are the factors that make proper mixing something far more complicated than appears on superficial examination.

To use a simple illustration: Imagine a barrel half filled with potatoes. The bottom of the barrel is filled with big potatoes to a depth of one foot.



TWO MOVABLE MIXERS, mounted on lorry cars, are located in this mixing room. A mixer moves from hopper to hopper to receive its charge, then moves out of the way to the end of the room to complete the mixing. Each hopper is equipped with a hopper scale.

The next foot of depth is filled with small potatoes. The problem here is to mix them so that, when they are poured out, every peck of potatoes will have the same number of large and small ones.

If the barrel is rolled or revolved on its axis with great rapidity, there will be almost no mixing, whereas if it is revolved with extreme slowness, the big potatoes will come to the top and the little ones will go to the bottom, and again there will be comparatively little mixing.

To suggest a very difficult hypothetical problem, consider the problem of producing a uniform mixture of such dissimilar substances as unshelled peanuts and BB shot, or roasted peanuts and a little salt (without the aid of the oil to make the salt stick to the peanuts). Obviously these examples are only to emphasize some of the problems of mixing.

The purpose of all mixing is to produce uniformity of mixture. Anything short of uniformity is a partial failure. Suppose a manufacturer were most particular to weigh each ingredient into the mixer with the greatest care and then find to his dismay that samples from successive batches did not analyze quite alike. That can happen with graded granular materials.

Another perplexing condition is found when successive samples from the same batch will not analyze alike, even though the mixer is still running. True, in some mixtures a little or even considerable variation is not considered particularly harmful, whereas in others there may be a

noticeable variation in color, flavor or leavening effects as a direct result of improper or ineffective mixing.

Those who have not given much thought to these problems of mixing dissimilar granular dry ingredients may find much to interest them in following through a few test batches in the plant. One way to study it is by means of the microscope with the magnification large enough to enable one to recognize and identify as well as count the particles visible. A small sample is carefully spread on a glass slide and examined for uniformity.

Apparently there is as yet no standardized technique for doing this, and so it should be emphasized that it is possible to obtain fictitious results by manipulation of the sample on the slide. The most common kind of error is to unmix the sample so that it will give the appearance of poorer mixing than is actually the case. Likewise, it is quite possible to show better results under the microscope than exist in the mixer.

The easiest way to record the results is to state them as an index of uniformity, 100 being perfect uniformity and 0 being a case where only one ingredient is visible in the field. On such a scale, 50 would represent a condition where the mixing was extremely poor, and even 85, while it looks good on the slide before it is actually counted, represents an average of 15 per cent deviation from a truly uniform mixture.

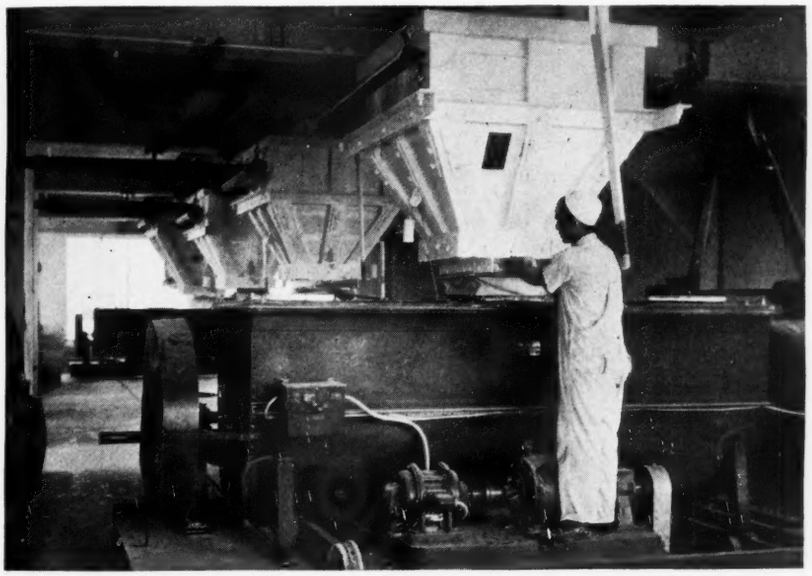
Suggested Method of Calculating Index of Uniformity

Use as a standard of comparison a mixture of the substances that have been so well mixed that no further improvement can be made. Count the number of each kind of particle in a considerable number of samples. If all ingredients are each of uniform size and density, the ratio of the numbers of particles in the samples will be practically constant. In non-uniform particles, the results are meaningless and the principles here stated may not correctly apply.

In operating the mixer, the purpose is to obtain the same ratio in each sample. To study the operation of mixing, take several samples at one-minute intervals and count the different particles in each of several microscopic fields. Assume that it is a two-ingredient mixture. Calculate the ratio of the particles of the two components in each field. Then average the ratios (not the number of particles), which gives a figure which is to be compared to the standard ratio by subtraction to obtain the deviation from the standard ratio. If there is no deviation, the mixing is perfect. However, the deviation, if any, may be converted to the percentage index of uniformity by substituting in the following formula:

$$100 - \frac{\text{Average deviation}}{\text{Standard Ratio}} = \text{Index of Uniformity}$$

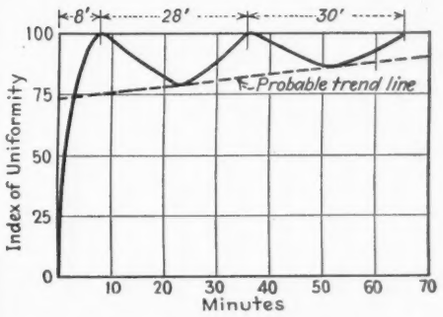
Where mixtures are made of three or more components, a suggested way to approximate the index of uniformity as a single index is by figuring the average index of uniformity of each ingredient as compared to the principal ingredient. Thus in a three-component mixture there will be two indexes. These can be averaged to give a single figure if that is useful for studying the operations of mixers.



DRAWING A CHARGE from a scale hopper into the mixer. The total charge is 5,000 lb. After the mixing is complete *and checked*, the car moves to one of several holes in the floor to discharge into filling lines located immediately below, to avoid further mixing and possible unmixing.

Practical Results

One of the striking results of microscopic studies of mixing is the discovery that an actual count of particles often disproves an operator's opinion that the mixing is complete. Manufacturers can do better than go on mere appearances alone. Thus an index of uniformity of 80 may have the appearance of being nearly perfect, but it means that there is likely to be a serious lack of uniformity of composition in small portions of the mixture. This is very important where packages are of very small size or in products where small portions are used from a larger package.



SHOWING PROGRESS OF MIXING. It is important to stop the machine when the index of uniformity is at its maximum. This phenomenon of alternate mixing and partial unmixing varies with every mixer and mixture, and is observable only when mixing dissimilar granular substances.

The next important discovery is the amazing fact that mixing of ingredients of the type mentioned here does not proceed uniformly to completion but proceeds in a series of dampened rhythmic waves of mixing and unmixing or segregation (see chart above).

The Rumford Chemical Works has known about this phenomenon of mixing and unmixing for more than 20 years through the researches of Dr. Charles A. Catlin, and, while no theoretical explanation of it has been developed, its effects have been carefully studied. Every mixer, even though it be a duplicate of another, has its own peculiar characteristic mixing period, and it may vary considerably between machines. Also it varies with the composition of the batch as well as particle sizes and their densities. Furthermore, any change of ingredients or change of density of one ingredient will change the mixing curve.

Each batch of 5,000 lb. is carefully checked in the control laboratory adjoining the mixing department before the mixture goes to the next operation. It is easily seen that 28 minutes of machine operation could be wasted if the mixer were allowed to overrun the first peak. Also the extra power consumed by a 25-hp. motor during this 28-minute period is a needless expense.

(Turn to page 432)

Protective PAINTING *Is More Than* Surface *Covering*

Courtesy N. J. Zinc Co.

IN THE INTEREST of better plant lighting, white paints used on interior surfaces often have to withstand the deteriorating effects of heat, steam and fumes.

By S. C. BRITTON
and
U. R. EVANS
Cambridge University
England

MANY paint users believe that the function of protective paint is simply to exclude corrosive influence—water and oxygen—from the metal below. They would define an ideal paint as one which is waterproof (perhaps even airtight), hard enough to resist abrasion, elastic enough to withstand without rupture the alternate stretching and contraction connected with temperature changes, and stable enough to escape alteration through exposure to air, rain and light.

Doubtless a paint which possessed such characteristics would give effective protection to steel, but most paint films are far from watertight; they take up water similarly to the way that gelatin takes it up. Such pervious films sometimes show as good protective qualities or better than those much nearer to mechanical perfection or imperviousness.

Protection is not gained solely through mechanical exclusion of corrosive influences. In general, the lowest coat should be chosen for its chemical properties and the upper for its mechanical properties. For example, red lead in the lowest coat has excellent rust-inhibitive properties, but its mechanical characteristics are poor; iron oxide in the upper coats is in most cases chemically inert, but yields coats which are mechanically improved.

Two types of failure in the paint may be distinguished. In the first type, rusting sets in first and then causes the mechanical failure of the coat; in the second type, the wastage or breakage of the coat first occurs and thus exposes the iron to rusting.

The true sequence of events sometimes is concealed by the fact that some externally applied stress may first cause the failure to become conspicuous.

The life of painted metal work may be said to depend on four variables: (1) the nature of the metal; (2) the presence of separating materials between metal and paint, such as mill-scale, rust, water or salt; (3) the character of the paint, as determined by the nature and quantity of the pigment, the oil, the thinner and the drier; (4) the character of the atmosphere, water or soil to which the painted metal is exposed.

The results of tests involving these variables, as far as they go, serve to bear out the superiority of copper steel over ordinary steel; they also point to the good behavior of wrought iron. There are two scales on wrought iron; one comes off very easily, while the other is so adherent that paint can be applied over it without causing any of the undesirable effects often met when paint is applied to steel without descaling.

When pure electrolytic iron and high-quality steel were exposed in the painted condition, no genuine advantage was discovered for the pure material. Below a poor paint, rust appeared rather quicker on steel, but neither material resisted long under coats of this character. Below a coat of good paint each material showed excellent behavior. Tests seem to show that there is no need to reduce the carbon or manganese content of steel, in order to obtain permanence, provided the paint is compounded on scientific principles. But it does not mean that all steels would fare equally well; there is considerable evidence that physical unsoundness

Taken from paper entitled "The Scientific Study of Protecting Painting," read before general meeting of the Electrochemical Society held in Chicago, Sept. 7-9, 1933.

and high sulphur content cause premature failure, and it is doubtful whether painting would prevent it.

It seems that descaling previous to painting is for certain purposes a desirable practice, although in certain tests scale below paint has appeared to delay failure. The deteriorative attack on scale-bearing specimens usually begins at a cut edge or break in the scale, undermines the scale by proceeding sidewise below it, and causes both scale and paint to flake off together. Rust should always be removed, as far as possible, by wire brushing before painting, for the rust adheres imperfectly and absorbs moisture.

Invisible moisture film, present on bright steel painted before dawn, caused premature failure, while salt shut in below the paint coat proved very harmful. Drops of sodium chloride solution placed on bright steel and allowed to evaporate before paint was applied caused the paint to commence to rise locally, sometimes after a few weeks' exposure. The probable explanation is that the salt draws in water by osmotic pressure, and the expansion below the paint causes the coat to crack.

In general, in the authors' tests, red lead for the lowest coat with iron oxide for the other coats proved to be a good combination, provided a tougher paint is not desired for the outer coat. Chromates appear excellent under some conditions, but may fail when exposed to acid conditions. Graphite may cause electrochemical corrosion if present in the lowest coats; for the outer coats it appears to have value. Metallic zinc paints as primers will give some "electrochemical protection" to steel at a definite gap in the coat. In practice it is best to mix zinc oxide with the metal. Protection has been observed under "immersed conditions," but not under atmospheric conditions.

As linseed oil tends to contract during drying and tung oil tends to expand, a mixture of these oils pigmented with iron oxide gives better protection than paints compounded with either oil alone. A rust-inhibitive pigment like red lead gives much more latitude in the choice and quantity of oil possible to use.

While with red lead the thinner content over wide limits is immaterial, with iron-oxide paints the protective value falls off steadily as the thinner content is increased. This is another illustration that protection by iron oxide depends on *mechanical exclusion* of corrosion influences, while that of red lead depends on *chemical inhibition* of corrosion processes to make waterproof paint unnecessary.

Water Causes Rapid Failure

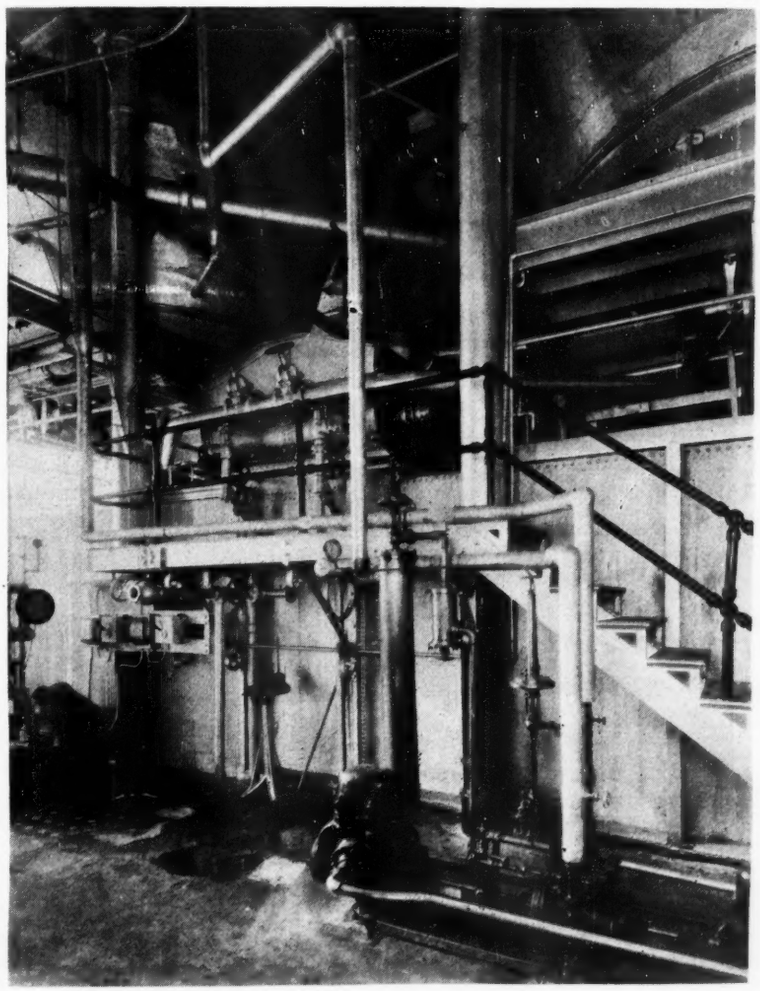
A paint rich in drier undergoes slow afterchanges and deteriorates; on the other hand, water falling on the paint coat before it is dry causes rapid failure. In tests commenced in wet weather, the degree of protection increased steadily with the drier content, while in those started in dry weather, it steadily decreased. Thus in dry climates, the drier should be reduced to a minimum, and in wet climates or doubtful weather, it should be added freely.

Since any conclusions based on observations conducted in a single atmosphere would be of limited value, tests were carried on at five stations, representing five types of atmosphere: country, marine, urban, mixed and under cover. The tests revealed that the country air gave slowest attack and the city air the quickest. Single coats were found to have given good protection in the country for $3\frac{1}{2}$ years, while it seemed necessary to apply two coats to insure a reasonable life for the coating in city air. The mixed air proved fairly corrosive in winter, but not in summer. Marine air was definitely less corrosive than the urban. The undercover specimens became covered with fine coal dust and suffered surprisingly little attack; the dust seemed to keep the specimens dry.

Because tests were carried out under five sets of conditions, the majority of the observations made in this discussion refer to all the paints tested and to all the stations. In addition, tests have been carried on with coverings of an "all-metal character." Favorable results have been obtained with sprayed coats of metallic aluminum on steel specimens.

EQUIPMENT in the Blatz Brewery, Milwaukee, Wis., is coated with aluminum paint to give sanitary appearance as well as to be protected against corrosion.

Courtesy Aluminum Co. of America



How Spaghetti *Is Canned*

By **DONALD S. HUBER**
Cereal, Pa.

SPAGHETTI has been canned for quite a number of years, and each year finds an increase in the number of manufacturers canning it. Is is canned in a number of different sizes, the most popular being the No. 300 and the No. 303 (net weight about one pound), for retail trade and the large, No. 10 can, for hotel and restaurant use. It is practically all canned with tomato sauce, the composition of which is based on the Italian sauce and has been a big factor in increasing the popularity of spaghetti.

The canning of spaghetti involves operations, not necessarily complex, but exacting in detail and demanding the closest supervision of every phase of manufacture, as each operation has a direct bearing on the quality of the finished product. The canner must exercise the utmost care in the selection of raw materials. He should set a high standard of quality for every ingredient that enters into his product and he should buy by this standard. It should be a routine procedure that a sample of every delivery of raw material be submitted to the control laboratory for analysis and that none be used until approved by the laboratory. The importance of this cannot be emphasized too strongly. To produce a product of uniform quality, not only must all canning operations be consistent in accuracy but all raw materials must be uniform in quality.

First in importance of the ingredients which enter into canned spaghetti is the raw spaghetti. The grade best adapted for canning is that made from semolina. Pure semolina spaghetti should have a light yellowish color, be translucent in appearance and free from bran specks. It should be brittle but not excessively so. For canning, it should not contain semolina siftings, farina or wheat flour, nor should it be artificially colored. It should not contain more than 13 per cent moisture.

Spaghetti suitable for canning should, during the process of blanching (scalding), absorb water fairly quickly and evenly without becoming pasty or sticky and clinging

FOURTEEN-STATION filling department for spaghetti canning. Filled cans are pushed from the tables past the productimeter counters to a rubber take-away conveyor belt which carries them to saucing and closing machines.

together in bunches. When washed and cooled after blanching, the spaghetti should be sufficiently firm and "elastic" to withstand the handling necessary in weighing it into the cans. In the finished product the spaghetti should have a certain firmness, yet be tender and soft, and the strands should not lose their round, even shape. For these reasons the canner should be sure that only pure semolina spaghetti is used. Spaghetti of other type will not blanch satisfactorily. The outer surface of the strands become soft and pasty while the center remains more or less hard and tough. If it has a pasty condition the weighing of the spaghetti into the cans is a tedious and slow operation. It will cling together in a mass in the can, preventing the sauce from mixing with it and gives a very unattractive appearance to the product when it is emptied from the can.

It is very important that the raw spaghetti be analyzed for the presence of artificial color. Food Regulations, both Federal and State, absolutely prohibit the use of artificial color in spaghetti, and, unless the canner makes his own raw spaghetti, or buys it from a reputable manufacturer, he must protect himself against the unscrupulous manufacturer who attempts to "enrich" his product by the addition of artificial color. The canner who sells artificially colored spaghetti is just as liable to prosecution as the manufacturer who made the raw product.

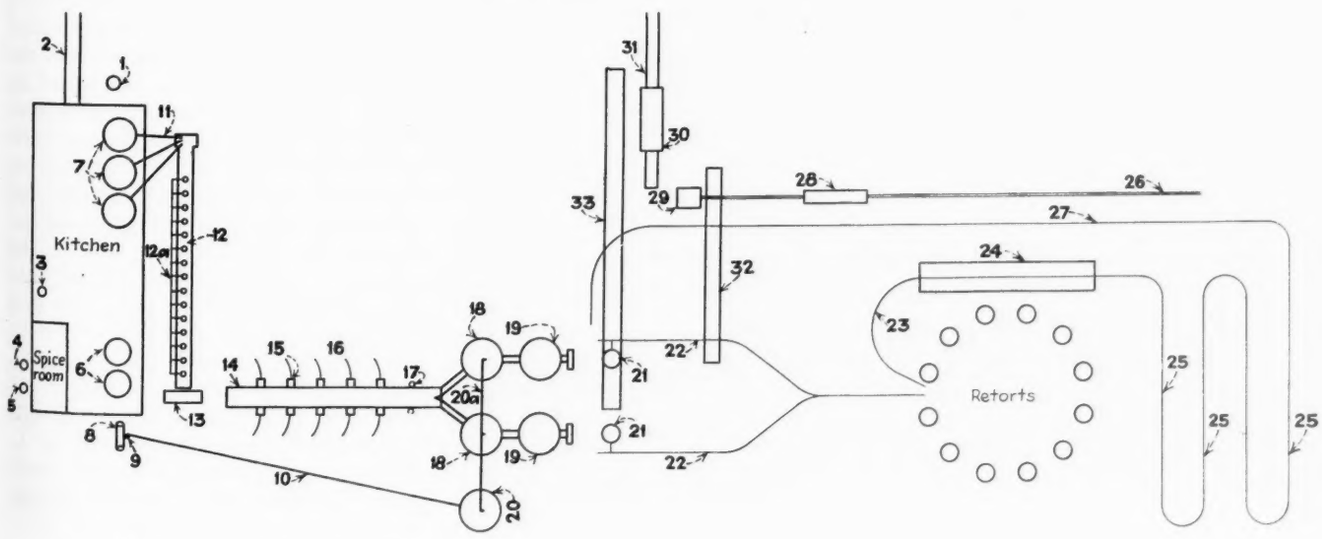
The first step in the process of manufacture is the blanching of the raw spaghetti. This operation is very important, as the character of the finished product is determined in a large degree upon the care and accuracy with which this operation is carried out. The term blanching as used in connection with canning of spaghetti and other food products is, in a sense, misleading. It is true that spaghetti is whitened when blanched, but the real purpose of the blanching is to soften it. In reality blanching is a precooking or parboiling. No specified time can be set for this operation that will cover all cases.

Some canners blanch from 20 to 25 minutes, others from 15 to 20 minutes. The time factor is one that each canner must determine for himself. The canner can best solve this problem by the means of preliminary blanching and canning experiments. Such experiments will assist him in deciding whether he desires a "wet" or "dry" finished product, a point which must be settled first, after which it is a simple matter to decide on the time for blanching and the amount of spaghetti to be used in each can. These experiments will also impress on him the necessity for absolute accuracy in the blanching operation, as he will learn that the large percentage of swelling and softening of the spaghetti takes place during the blanching and that any laxity in this operation will not be corrected in the subsequent processing or sterilizing.

For the blanching operation, copper or nickel steam-jacketed kettles are usually used. The kettle should have a gate valve at the bottom sufficiently large to permit the blanched spaghetti to be quickly drawn off. The amount of spaghetti to be blanched at one time depends of course on the capacity for blanching and the speed with which it is weighed into the cans. The blanching must be so planned that there is always a supply of cooled blanched spaghetti ready for the weighers.

The raw spaghetti is scattered loosely into the boiling water, to which salt has been added, one pound to twenty gallons. The spaghetti is added to the water in the ratio of

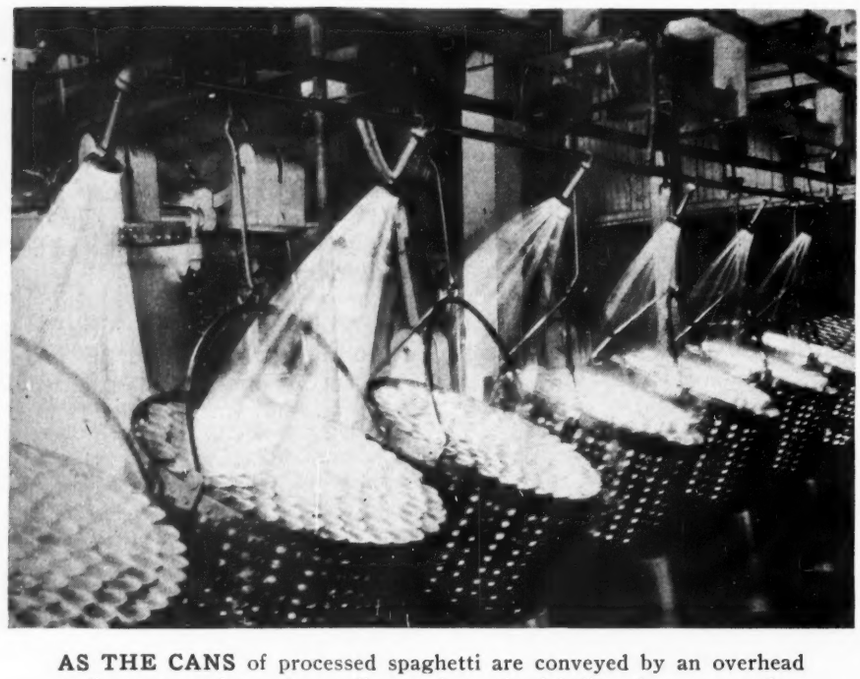
1. Kettle in which salt-sugar syrup is made for pumping to sauce kettles.
2. Booster conveyor to carry dry spaghetti to kitchen.
3. Cheese grinder.
4. Onion peeler.
5. Onion grinder.
6. Sauce kettles, 300-400 gal.; nickel or stainless steel.
7. Copper kettles, 500 gal., for scalding spaghetti.
8. Finisher for imparting smooth consistency to sauce.
9. Pump to force sauce to holding kettle.
10. Stainless-steel or enamel-lined sauce pipe line.
11. Pipes to transfer cooked spaghetti from kettles to cooling belt.
12. Spaghetti cooling belt.
12a. Overhead shower sprays.
13. Portable screen trays for cooled spaghetti.
14. Belt to carry filled cans to saucing machine.
15. Fillers' or weighers' tables.
16. Can tracks to supply empty cans to each filler. Kept full by an overhead main line which is filled from second floor or balcony storage.
17. Inspector stations.
18. Saucing machines.
19. Closing machines.
20. Sauce-holding kettle, 300-gal.; nickel or stainless steel.
20a. Pipe line from sauce holding kettle to saucing machines.
21. Retort crates.
22. Tracks for carrying filled crates to retorts.
23. Track for carrying crates of cans, after processing, to cooling tank.
24. Cooling tank.
25. Tracks for holding cooled crates of cans until dry enough to label.
26. Track for feeding cans to labeling machine.
27. Track for carrying empty crates back to closing machines.
28. Labeling machine.
29. Boxing or casing machine.
30. Case-sealing machine.
31. Conveyor for carrying filled cases to warehouse.
32. Chute for transferring empty cases from can feeding room to casing machine.
33. Conveyor for carrying cases of empty cans to can feeding room.



one pound to one gallon. It should be scattered loosely in the water to insure thorough blanching; if thrown in by bunches it is likely to cling together and retard blanching. After the spaghetti has been blanched the required length of time, it is immediately and quickly drawn from the kettle and cooled at once to prevent further cooking and to prevent it from becoming sticky and clinging together. The cooling is done by the immediate application of cold water. One method is to draw the spaghetti from the blanching kettle on to a heavy wire belt conveyor which carries it under a continuous spray of cold water from over-head shower sprays. At the end of the conveyor belt the spaghetti is caught in large wire screens set on portable frames. While held on these screens it must be sprinkled every couple minutes with cold water until it is delivered to the weighers to prevent its becoming sticky.

Another method is to draw the spaghetti from the blanching kettle directly onto the wire screens and placed under showers of cold water until the spaghetti is cool enough to be handled. Whatever method of cooling is used, the waste water must be taken care of in some manner that will prevent it from flooding the floor. This can be accomplished by placing large drip pans under the conveyor belt and wire screens, with hose or pipe connections to the drains. At best, the cooling and weighing of the blanched spaghetti is a wet operation, and it is very desirable to keep as much water off the floor as possible.

The next step in the process is the filling or weighing of the blanched spaghetti into the cans. The most desirable and economical way of doing this would be by means of a filling machine which would place the proper amount into each can, as is done in many other canning operations. But it seems the manufacturers of canning machinery have not been able to devise a machine which will do this successfully. To my knowledge there is only one canner of spaghetti in this country who is doing this part of the work satisfactorily by machine. This manufacturer invented and built his machine in his own plant and it goes without saying that his patent rights are well protected.



AS THE CANS of processed spaghetti are conveyed by an overhead trolley system from the cooling tank to the labeling department they pass through several sprays of cold water to complete the cooling of the cans and to remove all substances that might interfere with proper labeling.

Since filling machines are not available, this work becomes a hand operation. Girls are usually used as fillers or weighers, and the number necessary depends on production requirements and the speed and skill they have acquired. An experienced filler can, with efficient equipment, fill thirty cans a minute. This work is very tedious and nerve-racking, and to obtain highest efficiency fillers should not be kept at it more than seven or eight hours a day. The canner will find that if he is able to maintain steady production, instead of lay-offs of from two to three weeks between operations, he will obtain a much higher efficiency in the work of the fillers. There is a certain knack in the handling and weighing of blanched spaghetti which to the experienced filler becomes more or less automatic. This knack, of course, is not lost during the lay-off periods, but it does take a little while for the fillers to "get the swing" again.

An efficient system for this operation is to have the fillers sit at individual filling tables, arranged on both sides of a wide conveyor belt, on which the filled cans are placed and carried to the saucing and closing machines. Each table should be equipped with an accurate set of scales, a colander for holding the fillers' supply of spaghetti, and a water faucet with a shower head, as it is often necessary for the filler to moisten the spaghetti in order to prevent it from becoming too sticky to be handled properly. The counter should be covered, for sanitary purposes, with a sheet metal, preferably stainless steel. The counter should be so built that the water which drips off the spaghetti in the colander will flow off in the drain pipe.

The filling tables should be placed as close as possible to the cooling belt in order that the men or boy "servers" who supply the cooled spaghetti to the fillers will have but a short distance to haul the portable screens holding the spaghetti. The number of servers required depends on the number of fillers and the speed at which they are filling. One server should be able to keep four experienced fillers sufficiently supplied so that none need lose time waiting for spaghetti. It is also the duty of the servers to keep the spaghetti on the screens thoroughly moistened to avoid the possibility of its drying out and sticking together.

Empty cans should be supplied to the fillers by a system which will eliminate any loss of time in this respect. An efficient method is to supply the cans from a main overhead can-track with a track branching

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ONION POWDER

A New Use for Cull Onions

Onion powder made at Massachusetts State College. Note that the powder in the foreground is as white as the paper on which it is heaped.

By CARL R. FELLERS
Department of Horticultural Manufactures
Massachusetts State College
Amherst, Mass.

A POWDER that preserves the characteristic flavor of onion can be made from cull onions by a relatively simple method. In every onion crop, from 0 to 25 per cent of the onions are unmarketable, through being blemished, discolored, misshaped or otherwise off grade. These are the onions that do not conform to the four commercial grades recently promulgated by the Bureau of Agricultural Economics of the U. S. Department of Agriculture, namely: U. S. No. 1, U. S. Commercial, U. S. No. 1 Boilers, and U. S. No. 1 Picklers, depending upon size and quality. Ordinarily the cull onions have no other use than to turn them back to the land for their fertilizer value only.

The onions are blanched in boiling water for from two to four minutes. This loosens the outer scales of the onion and prevents the escape of offensive volatile oils which produce tears and irritate the membranes of the nasal passages. The blanched onions are then drained and cooled. Both ends are removed with a sharp knife, or an abrasive vegetable peeler may be used to remove most of the outer scales. In the latter case, hand trimming is necessary. The onions are stored in a 3 per cent brine until ready for slicing.

Slicing is done by machine, or by hand if only small quantities are to be handled. The slices are from $\frac{1}{8}$ to $\frac{1}{4}$ in. in thickness, and are placed on trays or screens in shallow layers and placed in the dryer or evaporator. An oven will do if nothing else is available.

The temperature of the air in the dryer should be maintained at 125-130 deg. F. for 3 to 4 hours, after which the temperature may be raised to 140 deg. F. Temperatures much above 150 deg. F. will caramelize the onions. The sugar content of dried onions is 55 to 65 per cent. The onion slices should be turned several times during the drying process, which will require from 10 to 24 hours, depending upon the humidity of the air in the dryer. Better results are obtained if the drying is done in cool weather. A fan which blows dry, heated air over the trays of sliced onions materially hastens the drying process. The onions are crisp and brittle when completely dried. The color should be white or gray; not brown. The yield is about 9 per cent of the weight of the onions.

While still completely dry, the slices should be finely ground to a fine powder in a spice or other mill. The powder keeps well when sealed in either tin cans or in glass jars. A large shaker-top container which can be sealed until it is desired to use the contents is another desirable type of container.

Tentative commercial methods of manufacture also have been worked out in this laboratory. Either kiln or tunnel dryers may be successfully used. A steam blanch of one minute after traying the sliced onions is beneficial and hastens drying. Bleaching by the aid of sulphur fumes in kiln dryers greatly improves the color. The final moisture content is preferably 5 to 6 per cent.

The powder is white to straw-

(Turn to page 404)

Grading and bagging onions. Heretofore the culls which are thrown out at the grading table have had no commercial use.

An onion farm at Hatfield, Mass.

IMPROVED METHOD *of* Processing GLACÉ and MARASCHINO Cherries

. . . . . Illustrating the proper way to get the sugar into and the water out of fruit without cooking it to pieces.

By S. BLUMENTHAL
Shirley Laboratories, New York, N. Y.

DIFFICULTIES were encountered immediately when the advent of the new tariff on imported cherries in brine and bleaching solutions forced the manufacturers of Maraschino type and candied or glacé style cherries to obtain their supply of raw materials in the domestic market, notably from California, Oregon and New York.

Methods of manufacturing then in use were well established through long experience on a volume of imported raw materials that has averaged 60,000 bbl. a year. The methods previously used in treating imported cherries were not applicable to the domestic variety. But as the importance of picking the cherries at the proper degree of ripeness was demonstrated and new information became available on improved methods of bleaching and storing them preparatory to shipment, these obstacles were soon surmounted.

Domestic cherries are generally of a softer texture than the imported ones, and their skins show a tendency to crack during the bleaching process. This problem was solved after much experimentation with a series of chemicals most of which are normally present in hard water. Their use was designed to harden the tender flesh of the fruit in the bleaching solution. Hardening may now be accomplished by the judicious use of the proper chemical, known as "hardening salts." For example, while some fruit may give the best results with precipitated chalk as the hardener, another may respond most satisfactorily to unslaked lime. The quantity and the concentration of the "salt" solution which is added to the bleach is important and should be carefully standardized. In this manner the cherries go through a chemical "bracing-up" treatment which renders them fit for further processing.

Glacé Cherries

The method of making candied or glacé cherries is a tedious one in which it has been found that experience is the best teacher. Almost invariably, a beginner's attempts have resulted in financial loss to his company. It is essential that the fruit that is being worked have plenty of meat and be of a firm texture, thus necessitating a proper selection of raw material. The texture usually is firm while the fruit is still saturated with the sulphur dioxide bleaching solution and thus may be misleading. Although the cherries usually tend to lose weight during processing, slow and careful treatment will remedy this and they can be made to increase in weight. Lastly, the quantity of wrinkled cherries obtained after sugar-processing will depend solely on the methods employed.

Domestic cherries are packed in a bleaching solution, about 200 lb. to the barrel, either stemmed and pitted, or "as picked." The bleach may be leached out by means of running cold water, or, if it is desired to save time, by a patented process known as the "Sulfree method." This method shortens the removal period considerably. The fruit is ready for coloring either red or green after the sulphur dioxide is out.

For red cherries the following procedure is recommended. Four ounces of certified red color, Ponceau 3R, is dissolved in a gallon of warm water. Twenty ounces of this solution will suffice to dye 300 lb. of fruit. Should rapid coloring be desired, the coloring solution should be kept warm, whereupon it will be found that the cherries will be uniformly tinted in about two days. The use of cold color may lengthen the time required from two to between four and seven days.

After the fruit has been colored, it is covered with 20-deg. Baumé sugar syrup solution which has been previously brought to a boil in a steam jacketed kettle. At this point the fruit must be watched very carefully. Should the cherries wrinkle, it is an indication that they cannot stand the abuse of a hot syrup, and if this proves to be the case, the syrup should not be heated to a high temperature at the beginning of the process. It is obvious, of course, that the manufacturer will have to take a chance on the first batch of cherries he makes by this method, in order to determine the maximum temperature he can use without wrinkling the fruit.

It will be found best, at the start, to maintain the temperature of the syrup at as near 120 deg. F. as possible when covering the fruit. Later in the treatment, when higher sugar concentrations are used and the cherries have absorbed a considerable quantity of syrup, higher temperatures may be used. If the product is to be turned out in a shorter time and show an increase in weight, as well as have a minimum percentage of wrinkled fruit, it is most *essential that the syrup be kept warm at all times.*

Let us now follow a controlled batch through the factory. As has been pointed out, the temperature will have to be varied according to the kind of fruit being worked. This is entirely up to the discretion and experience of the individual manufacturer.

The cherries are covered with a hot 20-deg. Baumé sugar syrup solution in a receptacle fitted with a steam coil. A wooden trough will be found suitable. The temperature is maintained at 120 deg. F. until the following morning, when the syrup is drawn off and built up to a 24-deg. Baumé syrup by the addition of more sugar. It is heated to the boiling point and transferred back to the cherries, where it is held at 120 deg. F. by means of the steam coil for the remainder of the day.

On the next morning the syrup is drawn off, reinforced to 26 deg. Baumé, brought to a boil, transferred back to the cherries, and the temperature again kept at 120 deg. F. for the remainder of the day. On the ensuing morning the process is repeated after the syrup has been built up to 30 deg. Baumé. After another day the syrup strength is increased to 33 deg. Baumé with corn syrup and the temperature raised and held at 140 deg. F. instead of the previously used 120 deg. F. At this point, if it is at all possible, the temperature should be held day and night for 48 hours. The use of a constant heating arrangement with automatic temperature control will more than pay for itself by speeding up the process of filling in the cherries with syrup, which, obviously, results in an increased weight.

At the end of the two-day period the syrup is removed and concentrated in the kettle until the Baumé hydrometer registers 33 deg. hot—i.e., at the boiling point—which is equivalent to 37-38 deg. cold—i.e., at 70 deg. F. It is then returned to the fruit, and the temperature again maintained at 140 deg. F. for another two-day period. Throughout this treatment there is a continual loss of water from the cherries by osmosis into the syrup and its evaporation from there. This, incidentally, results in a higher sugar concentration. By this time the transparent, glassy appearance is developing in the cherries as a result of the heating process.

When the cherries, and especially the centers, have become well saturated with syrup and have attained, in the opinion of the manufacturer, the proper "glassiness," the cherries and the syrup are transferred to the steam-jacketed kettle, and brought to a quick boil. *This is the only time in the entire procedure that fruit and syrup are heated together.*

After this final boiling the cherries are allowed to drain for at least 24 hours and, whenever possible, dried at 120 deg. F. in a drying chamber. In this way there will result a minimum leakage of syrup when they are packed in boxes or wooden pails.

The greatest advantage that this process has over the ordinary method of making glacé cherries is that at no time are the cherries and syrup heated together, except in the final step. However, it should be stressed again that the discretion of the individual manufacturer is a very large and important factor in turning out a successful product—one which is heavy, translucent and unwrinkled.

Maraschino Style Cherries

In making Maraschino style cherries for the candy and fountain syrup industries also, the heat process just described is applicable. Ordinarily the process is in cold syrups. Here again a saving in time is accomplished, and a good fruit is turned out. Very briefly, the method consists of removing the sulphur dioxide bleach and coloring the cherries by the use of 1.5 oz. of Ponceau 3R color for 300 lb. of fruit. The coloring water should be kept warm, as suggested for the glacé cherries. After the proper color has been attained, a warm 24-deg. Baumé sugar syrup is added to the barrel of cherries, after which 8 oz. of sodium benzoate and 4 oz. of citric acid, dissolved in water, are mixed in. The barrels are rolled around for a time to insure proper mixing. After several days, sugar is added to the barrels to bring the syrup up to 30 deg. Baumé, and some oil of bitter almonds flavor is added. The barrels are kept in a cool place and in a short time are ready for shipment.

The only time in the entire process that fruit and syrup are heated together is when the centers have become well saturated with sugar syrup and have attained a satisfactory glassiness.

HOW FLAVORS ARE USED

Legend

True and natural flavor — T
Synthetic or artificial — S
Original essential oil — O
Deterpenated or concentrated oil — D

| | Baked Goods | | | | | | | | | Confectionery | | | | | | | | |

Use . . . and Misuse of Flavors

CORRECTNESS in flavor is the measure of the charm of your product.

QUALITY in raw material, excellence in workmanship, and appropriateness in package are of no avail if flavor appeal is lacking.

TOO MUCH of the right flavor can be as objectionable as any of the wrong one. Exquisiteness depends upon the presence of the proper quantity of the expertly chosen flavor.

By JOHN H. MONTGOMERY
Fritzsche Brothers, Inc.
New York, N. Y.

THE FREQUENCY with which "flavor to suit" and similar phrases occur in formulas and textbooks on food processing is quite confusing and disarming to one seeking the best method of producing a marketable food product. Such phrases imply that flavor is incidental and in the nature of a "necessary evil" in food preparation. From the standpoint of the consumer, flavor often is the factor that decides whether a repeat sale will be made.

In the processing of your product it is well to keep in mind that flavor is as truly an ingredient of a food product as any constituent that enters into its composition, regardless of how the flavor is obtained. If the desired or identifying flavor occurs naturally in the food and can be satisfactorily retained by it during processing operations it may be regarded as a measure of quality and be thought of as an intangible characteristic of the product. When it is the result of the blending of components, each of which has its own characteristic identifying flavor, or is the result obtained through control of processing operations it may be the measure of workmanship and the evidence of the ability of the processor or of the correctness of the methods and equipment instead of the quality of materials used.

In the production of some food products, of which candies can be regarded as an example, the flavor of the resulting product is determined both by the workmanship with which the raw materials, generally devoid of any pronounced or inherent flavor, are processed and by the addition of a specific flavoring agent.

In any instance the flavor of the finished product depends upon the presence of certain definite substances which impart that quality of flavor by which the product is best known to its consumers. These substances may be present only in very small quantities and may resist efforts to isolate and identify them. Yet they are there as definite ingredients. If they are present in too minute quantities, the finished product may be "flat" or devoid of a pleasing palate appeal; if in too great quantities, their presence may be offensive and destructive to palate appeal.

In the case of those food products, such as candies, whose ultimate flavor depends largely upon the care with which the flavoring agent is selected and incorporated into the batch or mix, it is more apparent that the flavoring agent is an ingredient and that its presence in the finished product is subject to more direct control by the processor.

Such being the case, there is greater opportunity for determination of the proper flavoring agent to be used and the quantities necessary to give the most pleasing and uniform palate appeal. Each type of food product calls for its particular type of flavor and, as in the case of candies, each individual variety of the type may require a specific flavor and quantity used.

In the selection of a flavor for a given piece of candy, there are several factors which must be considered and must be studied in proper sequence. The first is public preference. Perhaps the popularity of a soft drink has already developed a potential market for candy containing a similar

Revision of paper read before the production forum of the National Confectioners' Association convention in Chicago, 1933.

flavor. An example is the tremendous demand for a grape-flavored chewing gum a few years ago, which doubtless was based on the popularized grape juice and grape-flavored beverages at that time.

The second consideration is the suitability of the flavor to the type of candy to be made. Certain flavors, palatable in some types but disagreeable or repulsive in others, would be barred at once. Thus, spearmint is popular in chewing gum and lime in hard candies, but either would be objectionable to a great number of persons in a cream center. In this connection, a governing factor is the possibility of the inclusion or omission of acid required to provide tartness and a background for many types of flavors, particularly those derived from non-citrus fruits. For this reason, such flavors are more effective in hard candies than in creams.

The third factor in selecting a flavor—by no means the least important—is the physical adaptability of the flavor to the conditions of manufacture. For example, delicate and fugitive flavors may be successfully employed, because the temperature is low, or in a hand-rolled cream center or even in machine-made "hand rolls." In casting from a mogul, on the other hand, the temperature and time of exposure are much increased and, consequently, stronger and more robust flavors are required to survive the operation.

High Cooked Candies

When dealing with high cooked candies, such as hard pieces, fudge, toffee and others, it is necessary to introduce the flavor at relatively high temperatures, which may have a deteriorating effect on some flavor constituents and a severe evaporating effect on others. The result in either case may be a flavor far from the one originally intended, unless the flavor introduced is designed to suffer such effects.

Flavoring clear, hard candies is one of the worst difficulties of the confectionery manufacturer, because the flavor, relatively insoluble in the medium, must be introduced with a minimum amount of working. Small batches, because they are easily handled and cool faster, give the best results. The flavors should be added on the slab, not in the kettle. Although this fact is well known, yet in a surprisingly large number of cases it is ignored. In fudge, which must be stirred, and in taffy, which must be pulled, the problem of uniform introduction is not so difficult; the working offers an ideal means of distributing the flavor at temperatures which are not too high for properly constructed flavors.

As an example of how a good flavor may be condemned through improper usage, an experience of recent occurrence may be cited. A rum-and-butter flavor was developed and used with marked success by a manufacturer of toffee. The same flavor was offered to another manufacturer, who was unable to obtain satisfactory results with it; examination of his product fully confirmed his assertion. Further investigation, however, revealed that, whereas the first user prepared his toffee in only moderate-sized batches and properly added the flavor on the slab, the second manufacturer made his toffee in unusually large batches and tried to stir the flavor into the candy in the kettle. Naturally, the highly volatile and yet essential ingredients which provide the rum effect in such a mixture were promptly boiled out, and the flavor was almost entirely lost in the process.

Gums and Jellies

Only the more robust flavors can be used for starch gums and jellies, as they must endure high temperatures and prolonged drying after the casting operation; they must require no assistance, as from acid, for their full development. In pan work, the flavor used in coating must likewise resist long exposure to moderate temperature under conditions which are ideal for evaporation of the more volatile portions of the flavor.

Fruit flavors which require the presence of citric or tartaric acid to simulate the tartness of the fruit are best used in hard candies, although cherry and wild cherry are effectively used in creams, because of the nut flavor of the pit, which contributes a substantial part of the flavor. However, the best flavors for candies lacking acid are those in the spice, mint or nut class and the miscellaneous ones, such as maple, malt, fig and honey, because they require no assistance other than the candy base.

Gums are best flavored with clove, cinnamon, anise, peppermint, wintergreen, sassafras and special mixtures, such as cachou and root beer; cream centers with peppermint, wintergreen, maple, fig, honey, ginger, rum, walnut, hazelnut and a few fruits such as raspberry, pineapple and orange. Coatings which are generally lacking in acid are subject to the same restrictions as cream centers.

Artificial Flavors

One of the questions which cause the most confusion in the minds of candy makers is the distinction between true and synthetic or imitation flavors. To many the latter term carries an implication of inferiority and even unwholesomeness. It is true that many synthetic flavors are inferior, and perhaps a few are unwholesome; however, the one fact does not follow from the other. A flavor may be true and unfortified, yet be inferior as a flavoring agent. Another may be wholly synthetic in its composition, yet represent the acme of perfection for the purpose.

The function of flavor in all food, particularly candy, is to make it tasty and, therefore, memorable. If a synthetic flavor is needed to accomplish that purpose, then it is proper to use it. Contrary to popular belief, synthetic flavors may be just as wholesome as natural ones. Furthermore, why should the candy maker feel limited to the use of a strictly pure raspberry extract which is quite unsuited to his purpose? Is is any consolation to the consumer to know that the candy contains pure raspberry if it doesn't taste like raspberry to him?

The cost of flavoring should not be regarded as a factor in raw-material or production cost. It is properly chargeable to marketing or advertising expense. Such a viewpoint depends on the belief that selling costs would decrease materially in the long run with the creation of a lasting sales repeat appeal which would outlast the most effective advertising campaign. Finally, flavoring carelessly chosen or incorrectly used will build up sales resistance at an unbelievably rapid rate. In any case, it is safe to say, if quality in the product is of paramount importance, "better no flavor at all than a poor one." Human memory retains bad impressions much longer than good ones. A bad taste is not soon forgotten.

Substituting *S-p-e-e-d* CONTROL for Process CONTROL

By **FRANCIS A. WESTBROOK**
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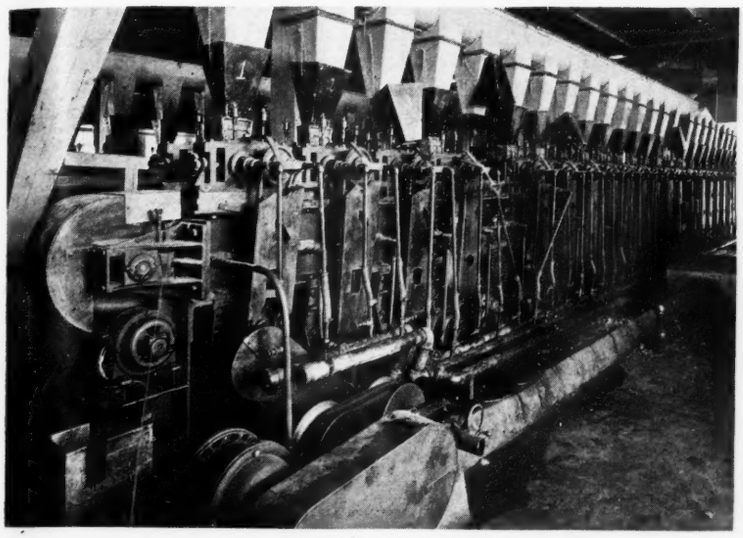
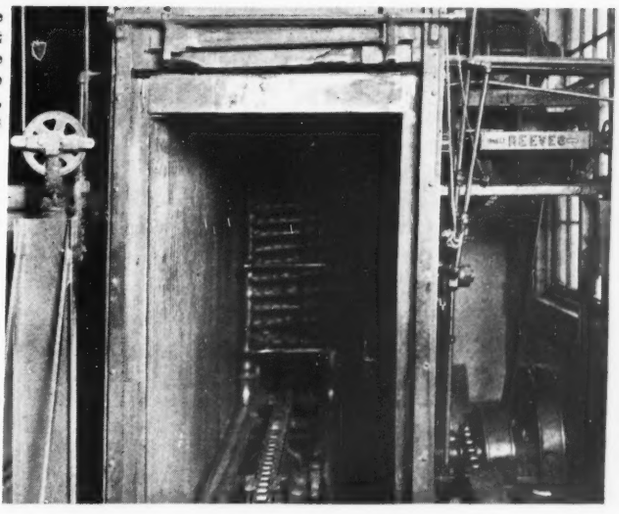




It is important that the speed of the take-away belt on this wheat shredder be synchronized with the rate of shredding. Otherwise, the shape of the biscuits may be spoiled.

When baking shredded-wheat biscuits in this oven it is easier to control time than temperature.

IN MAKING whole-wheat biscuit at the Kellogg Co., Battle Creek, Mich., there are several operations where the speed of the machinery must be changed at frequent intervals and within rather close limits. For instance, the belt on which the wheat shreds are placed as they come from the shredding mill must be run at varying speeds, depending on the rate at which the shreds are fed to it. The operation is automatic and it is essential that the speed of the belt be properly synchronized with the speed of the shredding mill; otherwise, the shape of the individual biscuits will be spoiled.

The belt is driven by a constant-speed motor through a variable-speed transmission unit which is very easily controlled by a handwheel. By making careful speed adjustments, spoiled material in process is reduced to a very low point and waste is practically eliminated.

The shredded-wheat biscuits are baked in the "Ferris Wheel" reel type of oven, in which it is not practicable to maintain a constant temperature. Of course, thermometers are used so that the actual heat of the oven is always known, so that by varying the speed of the reel it is always possible to give the biscuits the proper bake. It will be evident that accurate control of speed is necessary and that the changes must be made quickly as the temperature of the oven varies. Gears would hardly provide the requisite degree of flexibility, and slip-ring motors are expensive to operate and maintain. Consequently, a constant-speed motor driving through a variable-speed transmission is being used, and very satisfactory results are obtained.

Drying of the biscuits after baking is another delicate operation which must be carried out with great care, because if they are too dry they will crumble in their packages and if too damp they are likely to mold. They are carried through the dryer on a chain conveyor, and the amount of drying to which they are subjected depends on the speed of the conveyor. Here again, it is not practicable to maintain a constant temperature, and in addition to this the moisture content of the biscuits varies considerably with atmospheric conditions. In other words, the length of time during which the biscuits must remain in the dryer is subject to variations, and therefore the rate of travel of the conveyor must be varied from time to time. This speed control also is accomplished by means of a variable-speed transmission associated with a constant-speed motor.

Another interesting use of variable speed control at the Kellogg plant is in connection with the production of corn flakes. The flaking mills are fed with cooked kernels of corn by means of a screw conveyor. These flaking mills are not always all in operation. Different ones may be idle from time to time, depending on the demands of the production schedule. For this reason it is necessary to vary the quantity of cooked corn kernels fed to these machines, which means that the speed of the screw conveyor must be varied; otherwise there would be the possibility either of the mills becoming choked with too much material or of their not having enough to be running at full efficiency. The speed of the conveyors is controlled by variable-speed transmission units and constant-speed motors.

Controlled Mixing

An entirely different application of speed control may be observed at the new plant of Lever Bros. Co. at Edgewater, N. J. In this case it is used in connection with the production of vegetable shortening. In the preparation of this product there are variations in the temperature, chemical reactions, weight and consistency of the materials used which call for variable speeds during the agitating or mixing processes. For example, a heavy substance requires lower agitating speeds than lighter materials to obtain the best results.

Five agitators are used and each is equipped with its individual 1,200-r.p.m. constant-speed motor and variable-speed transmission unit, having a 6:1 speed range. Each transmission is of the inclosed type and the motor is mounted on rails on its top. The drive is through a speed reducer, all of equipment being mounted on top of the agitator. Three of these are driven by 25-hp. motors, one by a 15-hp. motor and one by a 10-hp. motor.

In each case the motor is connected to the constant-speed shaft of the variable-speed transmission by a silent chain drive. The variable-speed shaft is directly connected through a flexible coupling to the agitator head on a speed reducer. Four of these reducers have a ratio of 15.8 to 1 and one has a ratio of 8.6 to 1. With this arrangement it is possible to vary the rotation of the paddle shafts in the agitators anywhere between 90 and 15 r.p.m.

PEACH VARIETIES
Best Suited for Freezing

TESTS of 56 varieties of peaches have revealed wide differences in desirability for freezing in small consumer packages, the U. S. Department of Agriculture has announced. The studies have also demonstrated that very rapid freezing or the employment of very low temperatures are not essential to the preservation of peaches. Relatively slow freezing at 0 to 15 deg. F., followed by storage at about the same temperature, produces a satisfactory and desirable frozen fruit.

Of the 56 varieties thus far tested by J. S. Caldwell, J. M. Lutz, H. H. Moon and A. T. Myers, of the Bureau of Plant Industry, nine varieties received a rating of "excellent" and eight were rated as "good," all seventeen proving "superior in texture, flavor and freedom from discoloration to commercial packs purchased for comparison."

The nine varieties rated as excellent in these tests were: Chairs, J. H. Hale, a smooth form of J. H. Hale, Reeves, Up-to-Date, St. John, Orioke, Eclipse and Primrose (the last three from the New Jersey station). The eight varieties ranked as good were A-1, Brackett, Early Crawford, Late Crawford, Slappey, Roberta and an unnamed seedling grown by W. F. Wight, of the Bureau of Plant Industry. Many varieties which are desirable or excellent for other purposes are entirely unsuitable for freezing; for example, the yellow-fleshed clingstone varieties grown for canning in California made very poor frozen products, while many of the popular market and dessert varieties were lacking in one or more of the qualities essential in a satisfactory peach for freezing purposes. This was notably the case with white-fleshed varieties, all of which discolor badly.

ONION POWDER—*A New Use for Cull Onions*

(Concluded from page 397)

colored, keeps well, and possesses the characteristic flavor of onions. The product will not cake except in excessively damp weather. The addition of finely ground tricalcium phosphate or other caking inhibitors makes feasible the use of a perforated-top type of container. Limited tests show that the product keeps for several years when sealed. However, deterioration begins after several months if the powder is exposed to the air. There is a gradual change, as in many dried vegetables, to a stale, haylike odor and flavor.

The economy and convenience of onion powder recommends itself to both the busy home maker and to the commercial interests. A cook desiring a little onion in the soup, salad or meat has only to add a dash from the shaker. The raw onions do not have to be peeled, thus discoloring the hands and producing an offensive odor in the house as well. Furthermore, no tears are shed when the powder is used. The product has been pronounced very satisfactory by about 50 users in homes and restaurants.

Several so-called "onion salts" which were found on the market were examined for onion content. Two contained from 10 to 15 per cent and the other about 22 per cent of onion solids. The balance consisted of salt, starch and inert substances. These onion salts have not found much favor among home makers. Certainly they are not as popular as celery salt, for example.

Some of the industrial applications which suggest themselves for onion powder are in tomato ketchup, chili sauce and other sauces, pickles, baked beans, condensed and canned soups and in certain meat and fish foods.

Summary

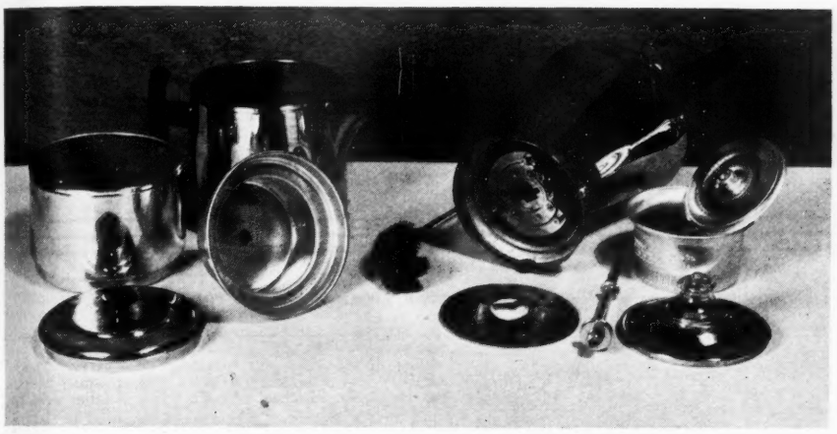
1. The preparation of onion powder from non-marketable onions is a simple and economical method of utilizing a portion of the crop.

2. The powder possesses the characteristic flavor of onions and conveys this flavor to the food.

3. The powder keeps reasonably well and fills a definite household and factory need.

4. Onion powder may be economically and conveniently used in such food products as ketchup, chili and other sauces, baked beans, pickles, condensed and canned soups, and in certain meat and fish products.

The *Brewing* Often Depends Upon the POT



For good coffee making a pot should have parts which are few in number, simple in shape, easy to fit together, and readily cleaned.

Protecting the quality of his product against consumer abuse is not the only hurdle that the coffee roaster has to clear. Too often, high-quality coffee is ruined during brewing through faulty design of the pot.

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ONE could hardly make tests of various grinds of coffees in more than forty pots (FOOD INDUSTRIES, September, 1933, pp. 354-356) without taking advantage of the opportunity to measure and to make record of the design of the pots. Our observations in reference to these pots and many others that have come to our attention have led us to suspect that coffee-pot designing is largely in the "by guess and by gosh" stage of development, and that in too many cases the possibility of a "By gosh, I'm wrong" step had never occurred to the manufacturers.

This situation seems to exist primarily for the same reason that has prevented the coffee roaster from paying more attention to the grinding of his coffee, as has previously been suggested (FOOD INDUSTRIES, August, 1933, pp. 291-293 and 336). Briefly, it is that the manufacturers too seldom look at their product through the consumers' eyes in an attempt to find out whether it meets the consumers' needs, desires or preferences. Far too often the coffee-pot manufacturer does not even know how a cup of good coffee should taste. Also, he practically never knows anything about the coffee that is to be used in his pot and what trends can be observed in the coffee business. Yet all of these things seem to us to be of primary importance.

A second reason for the absence of system in coffee-pot design probably is lack of appreciation by too many manufacturers of the value of time spent in investigation before actual design is attempted. To the best of our knowledge, no attempts have been made by any pot manufacturer to apply the "standard cup" method of coffee strength determination to the testing of coffee-pot performance, as was described in the second article of this series (FOOD INDUSTRIES, September, 1933, pp. 354-356). This, in spite of the fact that the method was explained three years ago (FOOD INDUSTRIES, September, 1930, pp. 401-404). We have heard of some attempts to use color, total solids and specific gravity of the beverage as criteria of extraction; methods which, in our own opinion, neglect the essential characteristic of good coffee—flavor. Clarity also seems to have received little attention except by the manufacturers of pots using paper or cloth filters. Certainly, there has been no publication of data on coffee-pot testing and design.

For these reasons it was felt that it would be worth while to attempt studies to find possible correlation between design factors and performance in the pots used in tests on coffee grinds. The conclusions reached are admittedly incomplete, since it was soon found that the relationships are very complicated, and that in general there is no one factor which is alone responsible for good cup strength. Rather, there are many, and extraction efficiency seems to depend on balancing one against another. Often, favorable design in one respect may be nullified by poor design in another.

Before going into the construction details and conclusions let us enum-

erate some of the things a prospective coffee-pot manufacturer or designer should know. First of all he should know how good coffee tastes. If he is at all in doubt about this, let him try the beverage produced by some of the best drip pots, carefully measuring 12 grams of fresh, properly ground coffee to each 237 c.c. (8 fl. oz.) of boiling water used. Such a pot usually will require about 3 minutes of dripping time per 8 fluid ounces of water.

He must endeavor to keep in touch with the coffee roasters, particularly those doing a national business. For, after all, their coffees are going to be used to a great extent in his pot, and he must be prepared to cooperate with them and take into account popular trends in the coffee business. The adoption of the "universal grind," previously described, is such a trend. Another—which even more directly affects the pot manufacturer— is the growing popularity of the drip method for coffee making.

Flavor and Clarity Come First

He must formulate a clear idea or conception of what a good coffee pot should be and what it should do. First, it should extract at least 80 per cent—preferably 90 or 100 per cent—of the flavor in as short time as possible—say, 15 minutes in the case of a drip pot when 1½ quarts of boiling water is used and 20 minutes or less in the case of a percolator starting with the same quantity of cold water and percolating not over 10 minutes. Secondly, when such a beverage is made, the turbidity—if no paper or cloth filter is used—should not exceed 10 mg. of insoluble matter per 15 c.c. of beverage. Thirdly, the design of the pot should be such that the beverage need not be overheated if ordinary care is used in its operation. By this we mean that no part of the beverage should reach 212 deg. F. except momentarily and the bulk of it should not attain a temperature higher than 190-200 deg. F. Probably more coffee brews are ruined by overheating than by any other cause. The "valveless" type of percolator is the worst offender in this respect, since usually it does not begin to pump until the entire mass of water is close to the boiling point. Consequently, the resulting beverage is practically always close to 212 deg. F., and the true coffee flavor is seldom obtained.

A coffee pot should be as free from complications as possible. The fewer the number of parts, the simpler their shape and the fitting of them together, the less resentment will be felt by the user against the pot. Most people are not very mechanical-minded and they are likely to be timid about anything more intricate than a door key and to be entirely disinterested in making any effort to understand it. Then, too, simplicity lends itself to cleanliness. And coffee-pot cleanliness is too often neglected by the housewife. While a drip pot may readily be con-

Table I—Dimensions and Design of Drip Coffee Makers

	Basket					Water Spreader			
	Size		Holes			Holes			
No.	Diam. Inches	Height Inches	No.	Diam. Inches	Total Area Sq. inches	Diam. Inches	No.	Diam. Inches	Total Area Sq. inches
1	2¾ / 3⅜	⅜ / 1⅛	1156	0.023	0.480	1⅛ / 3 1/16	8 / 12	0.050 / 0.040	0.016 / 0.015
2	3½	2½	1588	0.023	0.655	2½ / 3½	8 / 12	0.071 / 0.030	0.031 / 0.0085
5	4	2	1440	0.030	1.020	4½	15	0.030	0.016
7	3½	1⅜	127	0.110	1.21	5	400	0.065	1.34
8	3½–5¼	1½	456	0.038	0.567	5½–3½	4	0.042	0.0055
13	3⅜	2¼	1706	0.027	0.975	3¼	8 / 12	0.052 / 0.038	0.017 / 0.014
14	3⅜	2¼	1800	0.027	1.03	3½	8 / 12	0.046 / 0.038	0.0238 / 0.0136
15	3⅜ / 4¼	⅜ / 1⅜	1800	0.027	1.03	4	8 / 12	0.052 / 0.038	0.017 / 0.014
16	3¼	1⅜	Slots 30	.....	0.469	4	15	0.030	0.0106
18	3½	*2	1320 / 1560	0.030 / 0.025	1.616	3¾	407	0.045	0.646
19	4	1½	1125	0.032	0.900	....	..	.....	.....
21	3½	1⅞	220	0.038	0.362	4¼	5	0.030	0.0035
23	....	..	116	0.046	0.206	3⅞	36	0.120	0.408
25	3	1⅜	79	0.125	0.97	3½	65	0.073	0.273
26	3½	1½	1300	0.032	1.043	4	12	0.038	0.0136
28	3	1½	880	0.032	0.706	3⅜	8	0.037	0.0084
30	1⅜	1	2800	0.020	0.880	2¾	..	.....	.....

Table II—Dimensions and Design of Percolators

		Size of Basket		Basket						Water Spreader		
				Bottom Holes			Side Holes			Holes		
No.	Type	Diam. In.	Height Inches	No.	Diam. Inches	Total Area Sq. In.	No.	Diam. Inches	Total Area Sq. In.	No.	Diam. Inches	Total Area Sq. In
4	Valve Electric	3½	2	1350	0.030	0.955	1600	0.030	1.130	410	0.045	0.652
6	Valveless Top of Stove	3½	1½	336	0.036	0.342	576	0.036	0.585	56	0.112	0.550
9	Valve Electric....	4	1½	480	0.042	0.665	476	0.042	0.659	65	0.073	0.272
10	Valveless Top of Stove	3⅜	1¾	220	0.042	0.305	400	0.042	0.554	168	0.065	0.557
11	Valve Electric....	3½	1¾	650	0.042	0.900	720	0.042	1.00	520	0.046	0.865
12	Valve Electric....	3⅜	2¼	432	0.038	0.490	408	0.038	0.465	36	0.072	0.146
22	Valveless Electric....	3⅜	1½	450	0.038	0.510	364	0.038	0.413	50	0.055	0.119
24	Valve Electric....	3⅜	1⅜	360	0.046	0.545	300	0.042	0.415	173	0.066	0.591
27	Valve Electric....	3⅜	1⅜	420	0.052	0.890	0	0	0	426	0.052	0.900
29	Valveless Top of Stove	2¾	1½	360	0.052	0.714	312	0.052	0.664	24	0.059	0.0655
31	Valve Top of Stove	3½	1⅜	750	0.032	0.605	576	0.032	0.466	40	0.022	0.0152
32	Valve Electric....	3⅜	1⅜	465	0.038	0.527	364	0.038	0.416	50	0.063	0.156
33	Valve Electric....	4	1¾	560	0.042	0.773	476	0.042	0.657	62	0.070	0.238
34	Valveless Electric....	2¾	1½	336	0.036	0.344	126	0.036	0.128	107	0.063	0.334
35	Valveless Electric....	3¾	1½	450	0.038	0.513	308	0.038	0.349	50	0.055	0.118
36	Valveless Top of Stove	3½	1¾	656	0.036	0.668	1350	0.036	1.379	95	0.036	0.0965
37	Valveless Top of Stove	3⅜	1¾	424	0.036	0.433	300	0.036	0.306	36	0.070	0.139
38	Valveless Top of Stove	3⅞	1⅜	504	0.038	0.573	350	0.038	0.398	97	0.038	0.110
40	Valveless Top of Stove	3⅜	1¾	464	0.036	0.473	140	0.036	0.142	36	0.072	0.146
41	Valve Top of Stove	3⅜	1⅜	414	0.047	0.653	0	0	0	375	0.047	0.652

structed with this requirement in mind, even the best percolator is somewhat difficult to clean properly. The expansion chamber must be easily accessible and not be so narrow and deep that it is difficult to reach with a cleaning tool. The valve, if it is of this type, must be easily taken apart for cleaning. The pot spout must not be too narrow and involved. In this respect it would seem that the percolator manufacturer should make it *his* business to see that brushes appropriate for cleaning the spout and water tube are made readily available to the consumer. It is almost unnecessary to add that the pot should be free from crevices and corners that might catch and hold deposits. In brief, if the manufacturer wishes his customer to be satisfied with the purchase of his pot, he must be sure that proper tools are available for keeping the pot clean and *he must preach cleanliness* to the purchaser. A dirty pot will make only dirty-flavored coffee.

Metals May Affect Flavor

Finally, the materials to be used in constructing the pot must be considered. Theoretically, at least, glass and porcelain represent the ideal materials for coffee brewing. But, practically, some of the metals can be used without affecting the flavor to an extent that is noticeable to the average consumer. Pure aluminum is a metal that has given excellent results in our experience. Of course, it should be used alone in a pot, but it may be used in combination with some such metal as silver. When two metals are in contact with coffee beverage, an electrolytic cell or battery is formed and a metallic taste *may* be contributed to the beverage. A series of experiments have been started to learn more about the effect of metal alone or in combination on coffee beverage, but the work is as yet incomplete. It can be noted, however, that copper, brass and iron or steel generally are undesirable and that stainless steel, nickel, silver and tin seem to be harmless by themselves. A plated pot may be entirely satisfactory until some of the plating in the interior is worn thin. Then the beverage will acquire a foreign flavor, due to the base metal. Enameled-ware pots usually are satisfactory as long as the base metal is entirely protected, but may give a poor beverage when the enamel is cracked or chipped. The best test is to compare the beverage made in a doubtful pot with that made in an all-porcelain pot.

In Tables I and II the measurements made on the drip pots and percolators are given. The pot numbers correspond with those given in Tables I and II in the second article of this series (FOOD INDUSTRIES, September, 1933). In attempting to correlate design and performance, the two sets of data were used. The results of Grind No. 4 of Table II, p. 356, FOOD INDUSTRIES, September, 1933, were used in particular for performance comparison, since this represents the desirable "universal grind."

Suggested Specifications

As was stated previously, the observations that are to follow probably do not include all that may be made from the data. It is to be hoped that those individuals who are interested will find more and that they will extend the work to include other pots. The following relations seem true in regard to the drip pots:

1. When paper or cloth filters are used, the size of the holes in the basket and spreader are not of great importance.
2. The time of contact of the water with the coffee apparently should be at least 7 minutes. This means that a pot of small cup capacity must be designed so that the water flow through the coffee mass is retarded. This can be done by using small diameter holes in the bottom of the basket or in the water spreader without increasing their total area.
3. Large holes in the basket give poor clarity—should not be above 0.032 in. in diameter. Better 0.030 in. or less.
4. If the holes in the basket are small in diameter—let us say 0.023 in.—holes in the spreader may be larger both in diameter and area—0.050 or 0.060 in. in diameter and 0.040 sq.in. area, for example.
5. If the holes in the basket are 0.030 or 0.032 in., the spreader holes should be small in total area—0.015 sq.in. or less.
6. If the spreader holes are small in total area, it is preferable to use small diameter holes—about 0.030 in. This allows a large number of holes to be used with better distribution.
7. A few large holes in the spreader may result in channeling if the basket holes are not small enough to retard flow through them. Channeling results in low efficiency of extraction.
8. It is not necessary to have holes in the side of the basket.
9. Probably it is advisable to have air vents if the spreader makes an airtight joint with the basket. Vents may be around the top of the basket or may be in the spreader (in a raised section or tube).

Similarly, we may draw the following conclusions regarding the percolators:

1. Valve-type percolators in general give better results than the valveless. In the latter, overheating tends to produce flavor destruction, which may be more or less offset by loss of liquid by evaporation.
2. The valveless percolator may be either the top-of-stove or the electrically heated type. The former is more common because of lower cost. If electrically heated, the time required to heat the water from faucet temperature to the pumping point should not be over 4½ minutes per pint of capacity. In the case of the top-of-stove type, the heating time naturally will vary with the source and intensity of heat used. But in any case it should be possible to heat the water to the pumping point in 4 minutes or less per pint of capacity. Most valve-type percolators are electrically heated and in them pumping begins in 1 to 2 minutes after turning on the current. If, however, such a percolator is built for top-of-stove heating, the starting time should not be over 5 minutes—preferably less.
3. Fairly large holes in the basket seem to be permissible without adverse effect on the clarity. They should be at least 0.036 in. and not over 0.045 in. in diameter. The number of holes per square inch of basket area probably should be at least 25 and need not be over 50.
4. Holes in the side of the basket are not absolutely necessary. If not used, the total area of the holes in the basket bottom must be at least equal to that of the water-spreader holes. This is to avoid flooding of the basket. Theoretically, it would seem that side holes are undesirable in order that all of the liquid supplied to the coffee should pass through all of it.
5. There does not seem to be any close relation between cup strength and basket diameter per pint of capacity except that it seems wise to restrict it to less than 1.75 in. per pint. Deepening the coffee bed would seem desirable from the theoretical standpoint, in order to increase the time of contact of the liquid with the coffee.
6. The water spreader should have a large enough number of holes to insure good water distribution. But it is unnecessary to go to extremes; 35 to 100 seem ample.
7. The total area of the holes in the water spreader preferably should be over 0.25 sq.in.—possibly about 0.50 sq.in. This is advisable to insure an opportunity for the liquid to pass down through the coffee and not escape partly over the edge.
8. The diameter of the holes in the water spreader should not be so small that undue resistance is offered to the flow of liquid which necessarily is under a low hydrostatic head. A good range is 0.070 to 0.100 in.

Pots Should Be Tested

In conclusion, may we urge that coffee-pot manufacturers pay some attention at least to the factors we have mentioned in this article; that thought and experiment in the design of a coffee pot and thorough tests of its performance before it is put on the market will amply repay the effort.

We offer the above suggestions in the hope that some manufacturer will be interested enough to check their correctness by experimental work which his factory facilities permit and which is impossible for the author to perform. Any corrections which will clarify the situation will be welcomed.

The Kind of *Cocoa Beans* the Manufacturer Wants

DECIDING what botanical varieties of cocoa beans to buy is not the greatest problem of the manufacturer of chocolate and cocoa products. He may have reached a definite conclusion on that point and still be unhappy about the results he is getting in his finished products. He may have the services of well-trained and experienced technologists as well as of skilled and reliable production operators. Yet he may be troubled by lack of uniformity in the flavor, color and workability of his products. His brokers ostensibly supply him with his favorite varieties of beans. However, his technologists and production men report that in spite of blending, careful duplication of processing operations and controlled adjustments, they are not able to prevent the causes for complaints which arise from variations that occur during different seasons of the year and from year to year.

Many of these variations are more understandable when one becomes acquainted with the wide variations there are in the quality of the different grades of the same botanical variety of cocoa beans.

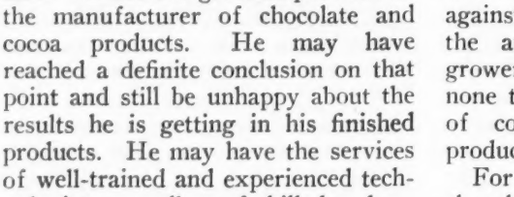
In a paper that appeared in the Bulletin Officiel de l'Office International des Fabricants de Chocolat et de Cacao for July, 1933, A. W. Knapp, assisted by E. Wiehr and Leon Olivier, discusses cocoa beans in a manner that is suggestive of what buyers of beans should guard against in their purchases. Although the authors wrote to advise the growers of beans, their discussion is none the less important to the users of cocoa beans and cocoa bean products.

For several years the trend in chocolate and cocoa manufacture has been such that we are not surprised to learn that while the light colored beans obtained from the Criollo cacao tree produce a finer chocolate than do those from the Forastero tree, the difference in the finished product is not so great as it used to be. Improved methods of manufacture have had a leveling effect. As the modern manufacturer generally wishes to produce a standard line in large quantities, he depends, in the main, on those beans which can be produced at reasonable prices and which are of a uniform quality. He will use expensive beans only by themselves for special choice lines or mixed with cheaper varieties to give "character" to a blend. For this reason, manufacturers would welcome the development of a Forastero bean which has been improved by a strain of Criollo.

Variations in market price of cocoa beans give evidence that quality depends upon the skill shown in preparing the beans for market as well as upon the botanical variety. The beans should be large (if possible, less than 400 count to the pound), healthy, uniform in size, and plump. The shell should be crisp and tough, not too friable, and practically detached from the cotyledons. When the bean is pressed powerfully in the hands it should break readily into a number of crisp nibs. The odor of the broken bean should be clean, pleasant and characteristic—usually vinegary. There should be no trace of a moldy, musty or smoky odor. The nibs should taste fatty, refreshing, nutty, not too bitter or astringent, and neither harsh nor sour. If the bean is cut lengthwise through the center, it should be fairly open-grained, indicating good fermentation. The color of the section may be cinnamon brown, dark brown, purple brown, or brownish purple, according to the variety, but should be bright and free from slate color.

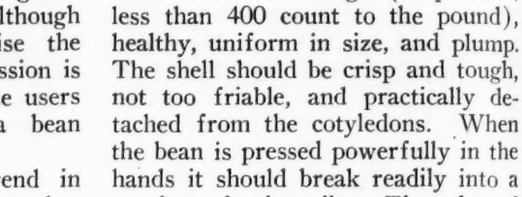
Defective beans may be moldy, have grubs or weevils, or show a slaty or a violet color. If moldy or grubby beans are present in a lot, they should not exceed 10 per cent.

Unripe beans usually are small and flat. As they generally ferment improperly, they have the violet interior and hard texture of underfermented beans. In addition, their interiors are often whiter or more pale than



Superior quality beans are large, uniform in size, healthy appearing, free from rubbish, plump and well fermented.

The presence of shriveled or broken beans, bits of shell, grubby or musty beans and other rubbish not only detracts from the quality of the beans but adds to the expense of cleaning and to the difficulties of getting a satisfactory roast on the beans.



normal and the surface of the cotyledons generally is wrinkled, because of shrinkage. These beans are not usually classified as "defectives" unless they are shriveled.

White spot is a curious defect often found in individual Accra, Nigeria and Bahia beans and occasionally in Trinidad and Guayaquil beans. It did not become generally known until 1925, when a large percentage of West African beans were heavily spotted. The beans look quite normal externally, but when the shell is removed, white or brownish spots (about 0.5 mm. in diameter) are found on the cotyledons next to the shell and between the folds. Many of the spots consist of rough rosettes of a crystalline substance. The seriousness of this defect varies with the manufacturer. As long as not more than 2 per cent of these beans are present in a lot, no complaint is likely to arise.

Overripe beans result when picking is done carelessly or infrequently. Such practice is likely in regions of native growing trees and where the yield per tree is low, as it is characteristic for a tree to be at the same time in all stages of production from the blossom to the mature bean-containing pod. The only objection to overripe beans is that the shell is more easily broken and for that reason the beans are more likely to become moldy or grubby. If the beans are sufficiently overripe they may germinate. Overripe beans are not usually counted "defective," but the presence of broken beans is objectionable, as they cause difficulties in roasting.

Germinated beans rarely appear in West Indian or Bahia beans. Their constant appearance in West African beans indicates carelessness in the gathering and fermenting of those beans. If properly gathered beans are not properly fermented, germination may result. The objection to slightly germinated beans is that they are more susceptible to grubs and mold. More advanced germination has a deteriorating effect upon the odor and flavor.

Underfermented beans are peculiarly hard, with a tight, hard shell and hard, compact cotyledons. They give inferior manufactured products. In the case of Accras—Forastero beans which have been fermented three days—the cotyledons have a purple or violet interior. Unfermented beans are slaty in color and cheesy in texture. They have a decidedly lower market price, whereas the difficulty of defining underfermented beans may prevent individual lots of underfermented beans from being penalized. However, the average price of beans from a district will be lower if underfermented beans become common for that region. It is well recognized that no fermentation, however skilfully conducted, will change a dark purple Forastero bean into a cinnamon brown Criollo; yet fermentation greatly improves cocoa beans. Not only the common varieties of cocoa beans suffer from poor fermentation. Fine Arriba beans from Guayaquil quite generally are about 33 per cent unfermented and some excellent Venezuela beans are very carelessly prepared.

A number of processes for "post-fermentation" and other novel procedures have been proposed to replace fermentation, such as: heating in water at controlled temperatures, freezing, boiling, treatment with alkali, and fermentation in the factories. For the present, at least better results are obtained by fermentation methods at points of origin of the beans. Also one wonders how far any economical process in the factory can overcome the defects of unfermented or slaty cocoa beans.

Moldiness is one of the most serious defects of raw beans, and unless drying is properly conducted, musty beans will result. Beans containing 8 per cent or more moisture will become moldy. Beans dried properly by the sun's heat are preferred. Artificially dried beans are spoiled if dried above 40 to 50 deg. C. or if allowed to come in contact with the fumes of the fuel.

Fragments of nib, shell, dried placenta, stones, dust, palm kernels, flat and shriveled beans, and other rubbish indicate poor cleaning of the beans before bagging. Not only does the presence of this rubbish increase the factory production expense; it often represents unnecessary tariff duties and freight charges.

Grubby beans are a very objectionable form of defective beans. Beans from West Africa are likely to be riddled by the larvae of the small beetle *Araecerus fasciculatus,* which thrive at tropical temperatures. Other beans, especially those with broken shells, are subject to infestation with larvæ and eggs of the small moth *Ephestia elutella.* Beans that have been stored in the tropics are especially liable to infestation, which may become even more destructive when the beans are stored for future use. Quite often beans may show no signs of infestation and yet later be obviously infested. When the moth infests the beans it deposits about 250 eggs, which are too minute to be noticed. These eggs may hatch out in the shiphold or in the warehouse. Even the grubs may pass unnoticed, but these grubs feed on the best portions of the bean and will become quite noticeable two or three months later when they are fully fed and come out of the bean bags in large numbers. Beans should be stored in dry, clean, well-ventilated places.

Water-marked bags may indicate that the beans were wet by the surf during transfer from the shore to the ocean-going freighter. The beans in such bags may be moldy or musty and otherwise contaminated.

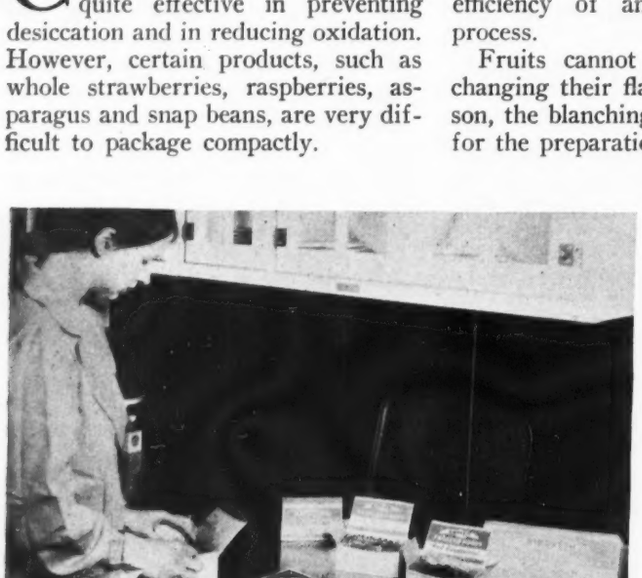
While some of these factors affecting the quality of cocoa beans are more important than others, all may enter into the difficulties which technologists and production operators have to overcome in their efforts to produce uniform quality products. Even the users of chocolate and cocoa products should give thought to some of these problems of the chocolate and cocoa manufacturer. They will then realize the importance of buying their chocolate and cocoa materials from manufacturers on the basis of quality flavor, color and workability.

Preventing Changes in Stored Frozen Foods

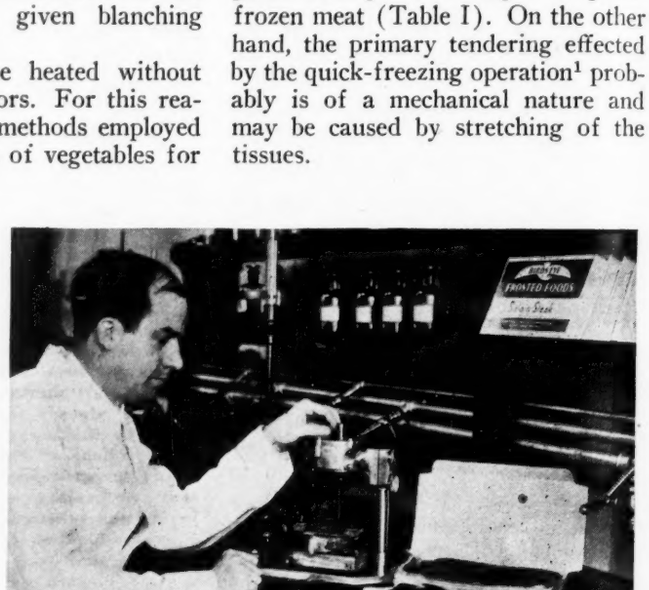
Poorly understood though they may be, the changes which may occur in frozen foods in cold storage which were described last month by Dr. Tressler may be prevented by fairly simple methods.—Editor.

By DONALD K. TRESSLER
Chief Chemist, Birdseye Laboratories
Gloucester, Mass.

COMPACT packaging in moisture-vapor proof materials is quite effective in preventing desiccation and in reducing oxidation. However, certain products, such as whole strawberries, raspberries, asparagus and snap beans, are very difficult to package compactly.



In quick-freezing, temperatures and packaging materials are chosen with the object of preventing as many changes as possible in foods during storage.



Increase in tenderness of quick-frozen meat probably due to physical effect of the freezing operation and to enzymic action during storage

In vegetables the enzymic changes can be altogether prevented or greatly retarded by the blanching (scalding) of the vegetable. This blanching treatment involves heating the vegetable to a sufficiently high temperature for a short period of time to inactivate or destroy the enzymes which catalyze the objectionable changes. It is probable that a large number of different enzymes work together in causing the development of "alfalfa hay" flavors, and in causing loss of color and flavor. Some of the more common ones which have something to do with these changes are catalase, oxidase, peroxidase, tyrosinase and invertase. We do not have laboratory methods for accurately estimating all of these in all products. However, we have found that vegetables usually keep satisfactorily if their catalase content has been inhibited. For this reason, we have used the estimation of this enzyme as a criterion of the efficiency of any given blanching process.

Fruits cannot be heated without changing their flavors. For this reason, the blanching methods employed for the preparation of vegetables for quick-freezing cannot be used for these products. The holding of these products at very low temperatures is an effective way of retarding the chemical and enzymic actions. Many years ago it was discovered that with each 18 deg. F. drop in temperature the speed of a chemical reaction is approximately cut to half. This law holds not only for the chemical laboratory but also in the cold storage. Thus products which at 18 deg. F. may be kept satisfactorily for three months may be held equally as well for six months at 0 deg. F. and for a year at —18 deg. F. The addition of considerable quantities of sugar to fruits also markedly retards many enzymic actions.

Enzymic actions in meat apparently are beneficial, except for those effecting changes in fat, as it is probable that they are largely responsible for the increase in tenderness which takes place during the storage of quick-frozen meat (Table I). On the other hand, the primary tendering effected by the quick-freezing operation[1] probably is of a mechanical nature and may be caused by stretching of the tissues.

Table I—Effect of Quick-freezing and Storage[a] on Tenderness of Grade A and Grade C Sirloin Beefsteaks

(Showing the combined effect of the freezing and enzyme action)

Grade A Mm.	Grade C Mm.	Remarks
22.7	16.4	Unfrozen
25.0	17.6	Quick-frozen and stored 1 week
25.9	22.2	Quick-frozen and stored 3 weeks
27.7	23.4	Quick-frozen and stored 5 weeks

[a]Storage temperature, —20 deg. F. (—28.9 deg. C.)

On the other hand, enzymic and chemical actions in fish produce objectionable changes in addition to those occurring in the fat, such as an increase in leakage on thawing and the development of salt-fishy odors and flavors. Light brining of the fish prior to freezing causes a decrease in the leakage observable on thawing. The presence of calcium and magnesium salts in the salt used for the preparation of the brine employed in treating the fish catalyzes during long-continued storage the increase in leakage (observable on thawing) and the formation of salt-fishy odors and flavors.[2] For this reason, brine prepared from pure salt should be used in treating fish prior to freezing.

[1]*Ind. Eng. Chem.*, Vol. 24, p. 242 (1932).
[2]*Ind. Eng. Chem.*, Vol. 24, p. 682 (1932).

(Turn to page 432)

Few Food Marketing Agreements Have Been Approved

Confusion in A.A.A. organization responsible for lack of action on the more than 200 codes and marketing agreements that have been submitted

AS AN ADJUNCT of the industrial recovery program most food manufacturers believe that the A.A.A. is a dead letter. Whatever it actually may do from now on is significant only to the industries whose affairs are inextricably linked with agriculture. The popular verdict already has put it down as a failure. This concerns the country as a whole because of the further measures that may be forced on the administration.

It has finally become patent to all that N.R.A. and A.A.A. are not a team but are hitched to opposite ends of the same wagon. N.R.A.'s forward progress in building up industrial employment and wages, with the consequent increase in prices, partially offsets increases in the farmers' crop returns and raises the cost of farm labor.

Regardless of the caliber of the Wallace-Peek-Brand brain and its concentration on its bewildering problems, the A.A.A. organization is badly confused. Foggy, nebulous, obscure and other synonyms are uttered by official lips to describe practically every pending undertaking. Industries whose lot was cast, willy nilly, with A.A.A. rather than N.R.A. are sadly perplexed. Many of them filed their proposed codes and marketing agreements weeks ago. On coming to Washington for conference, they discover that their documents have not even been read.

Master Code Under Fire

A.A.A. leadership has done little to inspire confidence; a few acts had better been left undone. Either they don't know their groceries or they know them too well. And groceries is a case in point. Whether justified or not, the A.A.A. is suspected of favoring the chains. That bodes ill for agreement on the master code of the food industries, projected by A.G.M.A. but revamped by A.A.A. and now undergoing revision to meet objections of Dr. Fred C. Howe, Consumers Counsel.

The marketing agreements that have been signed by Secretary Wallace can still be counted on the fingers. They are those for the Chicago, Philadelphia, Detroit, Twin Cities and Atlanta milksheds; evaporated milk; dry skim milk; California cling peaches and California deciduous fruit industries. Other milkshed agreements are in the hearing stage. Only a few other products have reached formal consideration, such as: macaroni, butter, meat packing, Southern rice, cottonseed, California dates, California walnuts. A larger number are being debated informally, but confusion in the A.A.A. organization hinders effective action.

Perhaps 200 codes and marketing agreements have been submitted in the meantime. The exact number is not known, beeause, for any reason you like, not all of them are routed to the publicity office. Many codes filed by regional and local producers, processors and distributors probably will be consolidated eventually. A digest of proposed codes which represent a wide cross-section of the food industries follows:

N. Y. Dried Apples Graded

Evaporated Apples—Submitted by the N. Y. State Evaporated Apple Packers' Association and the N. Y. State Apple Evaporators' Association. Fixes minimum wages and maximum hours in evaporating plants and packing houses. For the purpose of improving quality, the packers agree to distribute only New York standard grades as follows: extra fancy, extra choice, extra prime and standards. All consignments will be stamped in accordance with the above standards, the specifications for which have been established. Selling below cost is an unfair method of competition and packers will not guarantee against price decline. A uniform purchase contract form has been adopted, with provision for arbitration of disputes.

Brewing — Submitted by the U. S. Brewers' Association and American Brewers' Association. Fixes a minimum wage of $15 for a 40-hour week, with a permissible excess to meet peak demand of 192 hours per year at time and a third. The code prohibits a brewer from owning any interest in any license acquired after Sept. 1 to sell beer for consumption on premises covered by the license and from holding any interest, lease or mortgage against any premises where beer is sold for consumption on premises unless acquired prior to Sept. 1, in which case there shall be no agreement requiring tenant or mortgagor to buy beer from landlord or mortgagee; and from loaning money, equipment, fixtures or supplies to other dealers, except on the usual commercial credit terms. Secret rebating and similar practices are condemned. Deliveries are subject to a cash deposit of 75 cents per case, $4 for ¼ bbl., $6 for ½ bbl. and $8 for 1 bbl., to be collected by wholesalers and distributors from their customers. Wholesalers or distributors failing to comply, on a finding by the code administration board, are cut off by all brewers for six months. The board will be composed of three members appointed by the president of the U. S. Brewers' Association, two by the president of the American Brewers' Association, three non-members to be elected at a meeting scheduled for Sept. 27 in Chicago, and one by President Roosevelt.

Chocolate Industry Tightens Up

Chocolate and Cocoa—Submitted by the Association of Cocoa and Chocolate Manufacturers of the United States. Fixes an average 40-hour week during each six months, with a maximum of 48 hours per week and 8 hours per day. Minimum wage rates are 40 cents for men, 33 cents for women, and 37 cents for boys between 16 and 19 years. The code prohibits secret rebating, commercial bribery, loaning of fixtures, free deals, or payment for special advertising or distribution service by buyer, except on written contract for service rendered, excluding counter, shelf, floor or window display, and limited in the case of printed advertising to its actual cost on lineage basis. Contracts violating these provisions entered into prior to Aug. 15 become null and void. This also applies with respect to the prohibition against selling below cost of production and sale, including factory and general administration overhead and all direct charges. Each manufacturer must sell on the basis of open prices, uniform for quantity and quality to all buyers in the same market.

Coffee—Submitted by Associated Coffee Industries of America. Prohibits installation of any new roasting capacity, other than replacement, except on certificate of the Administrator. The code fixes an average of 40 hours per week in any one month at minimum rates of $15 for men and $12 for women, provided that, in distributing coffee, the hours shall be the same as may be applied in the case of food and grocery distributors. The code prohibits selling below cost of replacement, including the replacement value of green coffee, which is to be determined by a committee of the association, a minimum shrinkage of 16 per cent, and cost of delivery incurred by seller, provided that a roaster may meet the lawful price of a competitor for coffee of equal grade, quality and pack. Subject to the

same exception, a roaster may not deviate, without giving notice by mail, from his price list filed with the association. Sales made under exemption to meet competition must be reported. The code prohibits secret rebating; guarantee against price decline; cash discount in excess of 1 per cent 10 days, net 30 days; free deals, including those involving other groceries; samples in excess of 2 lb. to hotels and restaurants; gift or sale of packaged coffee to bazaars and parties, in competition with regular dealers; any service or advertising allowances to wholesale and retail distributors over actual cost of insertion; gift or loan of money or equipment, or furnishing parts, replacements or urn bags; free repairs; printing menus, counter cards, and the like. It provides that signs may be supplied gratis if confined to identification of a particular brand of coffee and dealer's name and that dies, drawings, printed bags, and wrappers for private-label packing may be supplied on full payment of cost at billing upon first shipment. Bona fide sale of equipment in accordance with the association's rules is permitted.

Confectioners Clean House

Confectionery—Submitted by the National Confectioners' Association. Fixes an average of 40 hours per week a year, with a maximum of 48 hours in any one week; to meet seasonal demands two shifts of 40 hours each, and for continuous processes, three shifts of 40 hours each may be employed. Minimum wage rates are 32½ cents in the North, 27½ cents in the South, with 75 per cent of such minima to learners with less than 90 days' experience. The code provides that after adoption throughout the industry of a cost accounting system prescribed by the association, no manufacturer shall sell below his own cost, except to meet lower prices of another manufacturer which are above that manufacturer's costs. Distressed candy may be sold under such conditions as the association may prescribe and such sales at or below cost must be reported to the association. Pending adoption of the cost accounting system prescribed by the association, no manufacturer may sell below the basic costs to be established regionally by "fair cost committees" for the several types of candy. Such basic codes may be modified by the Administrator upon ten days' notice following public hearing. Manufacturers would be required to file their price lists, specifying terms and conditions of sale, and weights and counts, and to report all changes. The code prohibits allowing any free goods, secret rebates, brokerage or any allowance in lieu of brokerage, any selling expense or any other allowance which tends or has the effect of decreasing published prices. Allowance for or replacement of returned candy is limited to 50 per cent of the invoice, minus transportation cost, unless the candy is returned on account of defects or other fault of the manufacturer. Permission for return must be granted in writing in advance. Claims for any deficit must be made within ten days after receipt by customer and no allowance or replacement will be made for any cause unless claim is made within six months of date of shipment. Repacking candy, except at full expense of customer, is prohibited. Excepting display devices or fixtures intended for advertising or window display purposes, no manufacturer shall give any premiums or prizes. The list price on candy sold retail at established unit prices shall include reasonable compensation to jobbers, wholesalers and retailers. Companion codes have been filed by the Wholesale Confectioners' Board of Trade and the Associated Retail Confectioners of the United States.

Corn Processing Statistician

Corn Products (Wet)—The code submitted by Corn Products Refining Co. and ten other wet-process companies fixes an average of 40 hours per week, with a maximum of 48 hours, at minimum rates of 40 cents for men and 30 cents for women. The code and accompanying marketing agreement are submitted with the understanding that they shall not become effective until the federal district court at Chicago modifies the terms of the decree entered April 6, 1932, restraining all the processors with one exception, from taking certain action. The marketing agreement provides for appointment by the Secretary of Agriculture of a statistician and investigator who is not connected with the industry and shall not be deemed an official of A.A.A. or the department. The marketing agreement also provides for creation of a processors' committee, four members to be elected by the companies and the fifth appointed by the Secretary of Agriculture. It would be this committee's duty to investigate operation of the code and marketing agreement, submit recommendations to the Secretary of Agriculture for correcting any evils disclosed. All processors would be required to report any and all violations of the marketing agreement to the statistician and investigator, who, if he finds that complaint is justified, would notify the Secretary of Agriculture for such disposition as he may determine. Appeal may be had to the Secretary from dismissal of a complaint by the investigator. The marketing agreement provides that no processors shall give to purchasers advance notice of any increase in price of corn products. Guarantee against price decline is prohibited except on cattle feeds. No processor may sell below his own cost unless to meet the competition of other processors, whose prices shall not be less than their respective costs, except in emergencies or to meet prices of competing products, or to dispose of damaged, substandard or distressed merchandise. This provision does not apply to export business. No processor would be permitted to increase his corn-grinding capacity without consent of the processors' committee, with an appeal to the Secretary of Agriculture, and no newcomers would be permitted to engage in corn processing by the wet process without the Secretary's consent.

Corn Milling — Submitted by the American Corn Millers' Federation for dry-process millers. Fixes a 40-hour week averaged over a 90-day period for bolters, grinders, and other processors, with a tolerance of 10 per cent on maintenance, repair and clean-up operations; and a 40-hour week averaged over a 180-day period for grain handlers, with a minimum wage rate of 40 cents per hour. The code requires that all corn millers be licensed and places administration of the code in an executive committee. The federation's package differentials would govern all sales and contracts. Shipments must be made within 60 days of date of contract, unless a carrying charge of ⅛ cent per hundredweight per day is added (2 cents per ton per day on mill feed). No quotations or invoices may be made on a bulk basis when shipments are to be made in sacks. Credit may be allowed if buyer furnishes his own bags, also for the return of bags at rates prescribed by the federation. Sale below cost, guarantee against price decline, and the waiving, non-assessment, cancellation or refunding of any charges specified in contracts are prohibited. The code also outlaws shipping on consignment, rebates and commercial bribery.

Export Business Exempted

Cornstarch Packing — Submitted by the Starch Manufacturers' Association. The marketing agreement prohibits sale below individual cost of production, plus reasonable cost of distribution, unless to meet competition of other packers, whose prices shall not be less than their respective costs, except sales made in emergencies or to meet prices of competing products, or sales of damaged or distressed goods. This provision does not apply to export business. The marketing agreement provides for election of a packers' committee of three members whose duty it would be to adopt marketing practices including terms, weight, grade, package classifications and differentials. All packers would be pledged to notify the association of violations of the agreement. If justified in its judgment, the complaint would be referred to the Secretary of Agriculture for disposition. Code fixes a 40-hour week averaged over a six-month period, a minimum wage rate of 40 cents per hour for male and 30 cents per hour for female labor.

Corn Oil Packing—Submitted by the Corn Oil Producers' Association. Agreement and code identical with those submitted for starch packing.

Fruit and Flavoring Syrups—Submitted by the National Association of Manufacturers of Fruit and Flavoring Syrups. Fixes a maximum 40-hour week at a minimum rate of 40 cents per hour. The code prohibits sale below actual cost, ascertained by a prescribed formula, of all products except those which are unmerchantable. Misrepresentation, false and misleading advertising and labeling, and manufacture and sale of adulterated or misbranded crushed fruits, flavoring syrups, flavoring extracts, food colors and allied products constitute unfair competition. Administration of the code would repose in the officers and delegates-at-large of the association.

Soda Water Flavors—Submitted by National Manufacturers of Soda Water Flavors. Practically identical with code submitted by the National Association of Manufacturers of Fruit and Flavoring Syrups, above. Administration is placed in the officers and board of directors of the association, with appeal to the Secretary of Agriculture. Signatories of the code also accept the provisions regarding unfair competitive methods of the codes of the American Bottlers of Carbonated Beverages and the Flavoring Extract Manufacturers' Association.

Committee Administers Code

Edible Gelatin—Submitted by Edible Gelatin Manufacturers' Research Society. Fixes an average of 42 hours per week for any 20-week period; with a maximum of 48 hours in any 26-week period, except in continuous-process operation. Then the maximum average is 40 hours in any 26-week period. The minimum rate is 40 cents per hour, with 80 per cent to learners. The society's board of directors constitutes a general planning committee to administer the code, which, apart from labor provisions, is little more than a statement to the effect that, if conditions surrounding importations of gelatin warrant, complaint will be filed with request that the President take action provided for in N.I.R.A.

Ice Cream Cones—Submitted by the Ice Cream Cone Institute of America. Substitutes three 8-hour shifts for two 12-hour shifts, with a maximum of 40 hours per week at 45 cents per hour for men and 30 cents for women and boys. Proposes a minimum price of $2.80 per 1,000 to jobbers for 5-cent size cones made on automatic or semi-automatic machines, and $2.70 per 1,000 for cones made on hand machines; and minimum resale prices to retail trade of 36 cents and 35 cents per 100, respectively. It is asserted that the prevailing price of $2.20 to $2.50 to the jobbing trade and 25 cents to 30 cents to retailers, does not return a fair profit, considering the short season. The code would prohibit shipment on consignment, inside prices, secret rebates, special terms, false invoicing, advertising allowances, free goods, prizes, gratuities, commissions or cash advances to jobbers, distributors and their salesmen. There would be no allowance to jobbers on old stock or slow sale items; and no guarantee against decline or advance in price after June 1 of the season for which a contract is taken. The institute's executive board would appoint a supervisor for each section of the United States.

Alimentary Pastes

Macaroni—Submitted by the National Macaroni Manufacturers' Association. Provides for sale to wholesalers at base cost and to retailers at base cost plus 10 per cent on bulk goods and 15 per cent on package goods. Base cost is defined as the cost per barrel of semolina, farina or flour divided by 196 lb., plus labor and capital costs, selling and administrative expense, and 1 cent per pound (net macaroni weight) for shipping, delivery and freight expense. Initial base cost would be established on the average production for 1932. No manufacturer would be permitted to sell a flour product in any region which has established a base price for semolina and farina only, at a price lower than that for semolina and farina. The code would prohibit guarantees against decline in price below the base price, shipping on consignment and selling or giving other products in combination with macaroni, when this has the effect of reducing the price of macaroni below the base selling price. The code requires adequate charges for extras. A label to the effect that "this macaroni product is below standard but not illegal" would be required on macaroni products made from durum semolina or durum wheat flour containing more than 0.75 per cent ash. A similar legend would be required on products made from hard-wheat farina or hard-wheat flour other than durum containing more than 0.48 per cent ash. All macaroni products except plain or egg noodles made from semolina, farina or flour must bear a statement of the character of farinaceous ingredients. Macaroni egg or yolk noodles containing less egg solids than that provided for egg noodles, under department standards must be labeled "Imitation Egg Noodles," accompanied by the statement that "this product contains less than 5.3 per cent of egg solids." Use of artificial color or substance imparting a color similar to eggs or which makes the macaroni product appear better than it is constitues violation of the agreement. No macaroni product may contain added ingredients except as specified by the standards, but no wholesome food ingredient is excluded if its presence is declared on the label. Both package and bulk products must bear a statement naming the product, the manufacturer or distributor and his address, and the net weight. All maufacturers would be licensed. Plants must be maintained in sanitary condition and open to inspection by a representative of the control committee set up by the agreement or the Secretary of Agriculture. The control committee would be composed of seven manufacturers appointed by the association's board of directors and two members appointed by the Secretary of Agriculture. The control committee would appoint special committees on standards, finance, statistics and labor.

Malt — Submitted by the U. S. Maltsters' Association. Fixes 40 hours a week averaged over a six-month period, except in Chilton, Kewaskum and West Bend, Wis., in which the six-month average may be 48 hours. Minimum wages range from $26 to $34 per week, depending on locality.

Malt Products—Submitted by the National Malt Products Manufacturers' Association. Fixes a 40-hour week at a minimum rate of 40 cents per hour, except to partially incapacitated old employees who are carried on payroll. The code sets up a planning and fair practice committee of five members appointed by the association.

Mayonnaise Defined

Mayonnaise — Submitted by the Mayonnaise Institute. Establishes standards for mayonnaise and salad dressing. In mayonnaise the minimum prescribed percentage of edible vegetable oil is 50 per cent and of oil and egg yolk by weight combined 70 per cent. In salad dressing the prescribed minimum of edible vegetable oil is 35 per cent. The presence of fillers must be declared on the label but no filler may be used to conceal inferiority. Standard sizes are 3 oz., 8 oz., 16 oz., 32 oz., 1 gal., and whole gallons in multiples thereof. The code prohibits sale in bulk for resale to the public except in original containers and shipment of goods on consignment. Cooperative advertising is limited to 56 lines per week for each newspaper employed. The code includes a cost schedule to be used by manufacturers in making reports. Manufacturers are required to file their list prices to retailers and all discounts to all classes of dealers. New price lists do not become effective for five days after filing. Price and discount lists may not differentiate between sales under private brands and manufacturers' brands. Sales below cost are prohibited except to meet competition. The code prescribes minimum differential charges by all national distribution manufacturers in excess of the lowest prevailing list prices to retailers established by any local distribution manufacturer which differentials shall be not less than the following: 3 oz.,

5 cents per case of 1 doz.; 8 oz., 15 cents; 16 oz., 25 cents, and 32 oz., 40 cents. Differentials apply on salad dressing only when a manufacturer's sales under his own name or brand exceed $100,000 in a marketing area. In which case the differentials added to the lowest prevailing prices established by any manufacturer whose sales are less than $100,000 shall be not less than 5 cents per case of 1 doz. 8-oz. jars; 10 cents for 16 oz.; and 20 cents for 32 oz. Discounts allowed from the manufacturer's list price to retailers are as follows: 15 per cent to wholesalers, corporate chains or voluntary chains for warehouse delivery; 20 per cent to wagon jobbers, provided that the discount on gallon sizes or over shall not exceed 15 per cent to chains or jobbers. To a single or exclusive wholesale distributor in a designated territory a discount of 20 per cent is allowed, provided that it may be reduced to 15 per cent by the executive committee if it is used unfairly. No manufacturer may continue to sell to retailers who charge less than list to them plus 10 per cent, nor to wholesalers who sell to retailers who sell at less than list plus 10 per cent. No manufacturer may sell to any retailer at a discount of more than 5 per cent from list to retailers, nor to any wholesaler, including wagon jobber, who sells to retailers at a discount of more than 5 per cent from list. The following are declared to be unfair trade practices: secret rebating, imitation of styles and trade names (all manufacturers must file a list and descriptions with executive committee), premiums or coupons, guaranteeing a wholesaler or retailer against decline in price on floor stocks, defaming competitors, mislabeling, misbranding, slack filling, false invoicing, giving gratuities to a customer or his agent for a sale to a retail merchant (except prizes to salesmen of an exclusive wholesaler), compelling a retailer to purchase products outside of mayonnaise industry as condition to purchase of mayonnaise products.

Price Guarantees

Pickle Packing — Submitted by the National Pickle Packers' Association. Provides for minimum prices to be paid for cucumbers. Unfair methods of competition include selling at or below average cost of industry when determined by executive committee and approved by Secretary of Agriculture, and at or below individual cost of packer or distributor in the meantime. A packer may guarantee his price against his own subsequent decline at date of shipment but may not guarantee floor stocks or his price against decline of competitors' prices. Unfair methods of competition include secret rebating; diversion of brokerage to purchaser or his affiliates; direct delivery to retail stores or member stores of chain or voluntary groups unless a differential is added to cover cost; free deals; freight or handling allowances in excess of actual cost; shipment on consignment except at prices sufficient to cover cost of handling, warehousing and accounting; private label allowances unless the label is completely imprinted and delivered at cost by buyers (in which case the maximum shall be 75 cents per 1,000 for glass goods and $1.50 per thousand for canned goods); false billing; defamation of competitors; acceptance from a grower of products contracted for by another packer.

Pretzels—Submitted by the National Pretzel Manufacturers' Association. Sets up a Fair Practice and Cost Board to study costs, wages and trade practices and submit recommendations to the end that no manufacturer shall sell at or below cost of manufacture and distribution. Unfair practices: secret rebating, prizes, free deals, shipment on consignment, advertising allowances to retailer, credit to distributors and retailers for return of stale or broken pretzels, and use or pick-up of competitors' cans. A deposit of 25 cents is required on each returnable metal container and on each glass display cover.

Spice Grinding — Submitted by the American Spice Trade Association. Prohibits sale below cost of replacement. The replacement cost of raw materials is to be computed on basis of New York spot market price prevailing on date of sale. Such price is to be determined by a committee of two grinders, two brokers and one importer. Unfair practices: commercial bribery, inducing breach of contract, misbranding, secret rebating, disparagement of competitors, false reports of capacity, production, inventories, sales, orders or shipments; substitution of goods, contracts not obligating purchasers to any specified quality or quantity, guarantee against price decline, false dating of invoices, contracting for a year or less without providing for price readjustments at 90-day intervals (except on contracts for sale to manufacturers for consumption by them), failure to comply with department standards, imitating competitors' brands or marks. A fair practice and planning agency would be set up composed of five members of the executive commitee of the grinders' section of the association and two nonmembers of grinders' section.

A.A.A. Is Organized To Rehabilitate Agriculture

THE Agricultural Adjustment Act signed by President Roosevelt on May 12, 1933, created the A.A.A. to restore to agriculture its proper place in the national economic well-being. This Adjustment Administration has followed two main lines of attack: adjustment of agricultural production to demand and establishment of marketing agreements to procure fair returns to producers of agricultural commodities and to remove burdensome supply from the market. Additional duties have been given it under the executive order of the President. Codes of fair competition for industries engaged principally in handling milk and its products, tobacco and its products, and all food and foodstuffs are being filed with this Administration.

On three of the basic commodities—corn and hogs, cotton, wheat—the attack on the problems of farm surpluses, low farm prices and depleted farm buying power is specifically under way through production-control programs, while the whole farm field is concerned with and affected by the marketing agreements and codes of fair competition that are being considered or have been made effective.

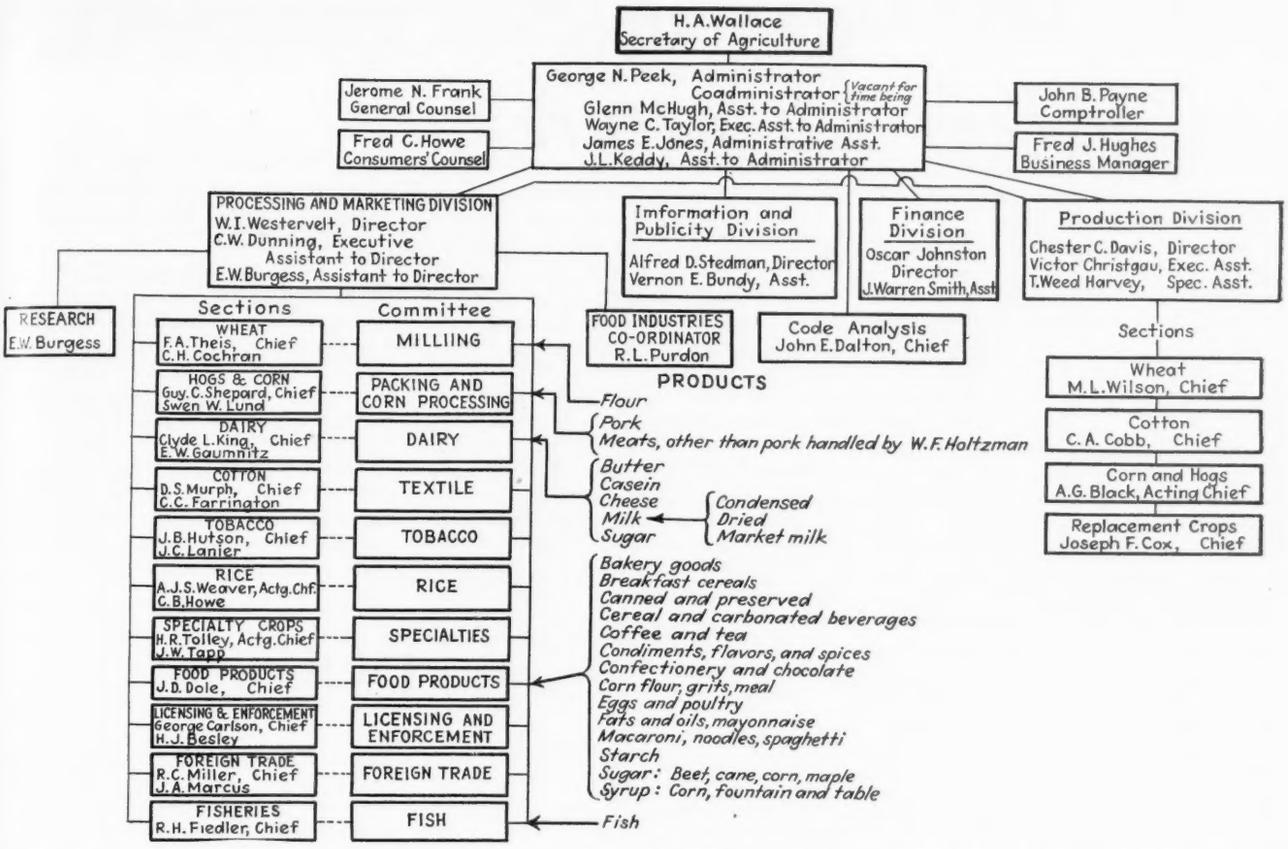
Cotton, wheat and tobacco production programs have been launched. Marketing agreements in the dairy industry have been considered for numerous milk sheds. Under the President's executive order, more than 50 industrial groups have had formal or informal conferences leading toward formulation of marketing agreements or codes.

The organization developed in the five months since the A.A.A. act became law has been devised and adapted to deal with the adjustment problem. Organized under Secretary Wallace, the Adjustment Administration is simple in structure. An administrator and a coadministrator are directly charged with supervising and directing all its activities. They are assisted by a group of assistants designated as "administrative officers."

The administrators have developed the Administration into four main divisions: production, processing and marketing, finance, and information and publicity.

In addition to the members of these divisions, other administrative officers have been selected to develop and administer such phases of the farm program as do not directly come under the four principal divisions. One such officer is the Consumers' Counsel, who, in the language of the act, is "to protect the consumers' interest." World trade representatives have been selected to develop foreign outlets for agricultural products.

With the enactment of the N.I.R.A.



the executive assistant to the Administrator of the A.A.A. was assigned, in a liaison capacity, to coordinate the activities of the two administrations and a section of the A.A.A. was created to analyze proposed codes and marketing agreements.

There is a close relationship between the divisions of production and of processing and marketing. Their activities are coordinated through cooperation between the directors of these divisions.

In each division separate sections have been organized for wheat, cotton, and corn and hogs. In other sections organized for tobacco, dairying, rice and specialty crops, both production activities and those of processing and marketing are consolidated under the direction of a single section chief.

A chart showing the correlation of activities and the personnel of the various offices of the A. A. Administration is given above.

Federal Injunction Closes California Cannery

The battle between A.A.A. and the California peach industry reached a climax on Sept. 20, when a federal injunction closed Calistan Packers, Inc., for violation of the peach marketing agreement. Secretary Wallace charged that the firm was canning peaches in excess of its allotment.

The action of the Administration in revoking the license of Calistan Packers, Inc., follows closely the charge against 50 milk dealers in Chicago of violation of the milk agreement. In each case of alleged violation, opportunity was given the defendant to show why his license should not be revoked.

The peach industry has been opposed to the A.A.A. tactics. Following a letter by Administrator Peek to wholesale peach dealers, requesting adjustment of contracts with yellow cling peach canners to the price scale named in the agreement, objections virtually poured in from canners and distributors.

California canneries have been ordered to pay an assessment of $5 per ton on all peaches packed, instead of $2.50. The surplus will go to the peach crop control committee, which will distribute it in the form of payment for surplus production.

To Place Milk Agreements On Trial for 30 Days

Milk marketing agreements in future will not be approved without reservation, but will be placed on trial for a 30-day period in which their fairness may be tested. Such is the substance of a statement by the Farm Administration.

During the trial period, only prices to producers and maximum retail prices will be fixed. And thorough examinations of the books of distributors, dealers and stores will be made to gage price spreads.

The decision to put future agreements on trial resulted from the difficulties arising under the Philadelphia agreement, against which both farmers and consumers registered vigorous complaints. These objections may cause a complete revision of the Philadelphia agreement.

Plans to buy the excess production of the dairy industry for distribution to relief agencies were outlined in a recent address by Dr. Clyde King, dairy administrator of A.A.A. The funds for such purchase probably would come, Dr. King predicted, from a processing tax on milk and milk products.

Millers Demand Tax on Corn

Flour millers are pressing the Secretary of Agriculture for a compensatory processing tax on corn. They hold that sales of corn flour and meal in the southeastern states are increasing at an alarming rate. The A.A.A. figures it will need a tax of between 20 and 30 cents a bushel on corn to even things up, but hesitates to apply the tax because of the inevitable storm of protest that will arise from the corn processors, particularly the starch and corn products refining group, the products of which can hardly stand it.

ABSTRACTS OF *Current Literature*

SOY BEAN OIL. S. F. Yushkevich, S. A. Brilling and F. V. Antonenkov, *Papers of the Central Biochemical Research Institute for the Food Industries,* U.S.S.R. (Moscow); Vol. 2, pp. 380-399, No. 9 (17), 1933.

Fineness and moisture content of the meal and the nature of the solvent have much to do with both the yield and the quality of extracted soy bean oil. In rapid extraction the meal must be quite dry to give a satisfactory yield, but if ample time is allowed—4 hours—moisture content does not affect yield. Coarse meal gives a poorer yield than a well-ground meal. Trichloroethylene and ethylene chloride are among the best solvents. They are useful only for oil for industrial uses, because they impart an unpleasant flavor. For extracting edible soy bean oil benzene, carbon tetrachloride and gasoline are by far the best solvents; they give an oil having the characteristic odor and taste of the pure soy bean oil.

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MARCH OF ACIDITY IN STORED FLOURS. A. Schulerud. *Cereal Chemistry,* Vol. 10, pp. 129-139; March, 1933.

Samples of three rye flours and one patent wheat flour were stored under commercial conditions for a year. At intervals acidity was determined in ether, 96 per cent and 67 per cent alcohol extracts, as well as in fresh suspensions of the flours. The total increase in acidity, within the same flour, is approximately the same by all the methods used. The Greek acidity method, using 85 per cent alcohol, gives results comparable with those obtained by other methods extracting the fatty acids. A graphic picture of the development of acidity is very regular.

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CAN SEALS. E. Jahn. *Zeitschrift des Vereins Deutscher Ingenieure,* Vol. 77, p. 600; June 7, 1933.

The American idea of plastic or liquid can-sealing compositions, applied by automatic machinery, was very slow to penetrate continental European practice. But when started, about a year ago, the new method made excellent progress and serious attention has been given to edge-crimping methods and to relative merits of liquid can seals and solid compositions applied with heat. Between the ideal case of the perfect crimp in which a tight seal is effected by metal-to-metal contact and the imperfect heat-applied seal in which the sealing ring covers only one of the crimped metal folds, there is the seal in which a liquid composition penetrates both folds and maintains tight contact. Improvement in sealing compositions also should be commercially feasible to meet these requirements; viscosity low enough for proper spreading, but high enough to prevent spattering; absence of fillers or other solids which can clog the spray nozzle; no dripping at the nozzle when air is shut off; fast setting to a strong, even, bubble-free film; durability in storage; and freedom from any ingredients which could impart undesirable odor or flavor to contents of cans.

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SOME PROPERTIES OF ERGOSTEROL AND CALCIFEROL. A. L. Bacharach and others. *Analyst,* Vol. 58, pp. 128-135; March, 1933.

Calciferol is crystalline vitamin D. Both these products are now articles of commerce. A precise specification of the physical constants of calciferol is highly desirable, so that vitamin D may be sold by weight for commercial purposes. These constants have been determined for products prepared on a manufacturing scale, and the results set forth in detail. They include the following: appearance, stability, melting point, optical activity, color and other reactions, and biological activity.

NEW BOOKS

BUSINESS UNDER THE RECOVERY ACT. By Lawrence Valenstein and E. B. Weiss. Published by Whittlesey House, McGraw-Hill Book Co., 330 West 42d St., New York, N. Y., 1933. 314 + XIV pp., 5⅜x7¾; cloth. Price, $2.50.

CONCERNING themselves with the broader effects of the N.I.R.A. on business the authors focus attention upon merchandising, selling and advertising under the Recovery Act. As specialists in advertising they review the economic history of American business and trace the development of the philosophy and practices in business that paved the way for the present form of "business-socialism." The chapters on the rôle of the producer, wholesaler, retailer, and association advertising strike almost as close to home as if they had been written with the food manufacturing and marketing industries definitely in mind. There is no mincing of words in the discussion on the folly of past practices and on what must be done under present and near future economic conditions if industry is to survive. While they regard the N.I.R.A. and its application as being a long way from perfect, the authors feel that its basic principles will permanently become a part of our fundamental law by the time its two years of probational life have ended. Written in easily read style and from a decidedly human as well as an intelligent point of view, this book is one that every business executive can well afford to read. He may not agree with the authors in every respect, nevertheless he should consider other than his own point of view of what N.I.R.A. means to him and his business.

LABOR RELATIONS UNDER THE RECOVERY ACT. By Ordway Tead and Henry C. Metcalf. Published by Whittlesey House, McGraw-Hill Book Co., 330 West 42d St., New York, N. Y. 1933. 258 + XII pp., 5⅜x7¾; cloth. Price, $2.

OPENLY fostering the formation of company and industry unions the authors seek to advise trade associations and companies how to deal with their labor so as to comply with the N.I.R.A.

In their championing of company unions Tead and Metcalf do not advocate supplanting the activities of the nationally organized unions, which they believe to be better organized and equipped to negotiate with employers on matters too embracive for individual company action. Rather they believe that the functions of the two types of unions are complementary, and that the industry trade associations should negotiate or join with the national labor unions for the working out of industry labor problems, leaving the individual company problems to be dealt with by the employers and their company unions. Much attention is called to national industrial councils which represent the correlation of labor union and trade association or industry dealing with industry labor problems. While this book will appeal only to those employers who look favorably upon collective bargaining, it should not be lightly disregarded by those who oppose. The labor clauses of the N.I.R.A. bring each employer face to face with his employees and what shall be his policy in dealing with them. If he does not keep on happy terms with them he may have to deal with the national unions.

How the N.R.A. Codes Affect Truck Use

COMPLIANCE with the N.R.A. codes by companies in the food field will greatly increase delivery and transportation costs unless the wheels of the trucks are kept turning for a far greater percentage of the time than heretofore. This can be accomplished only by an improved operating supervision of the fleets.

The intention of the codes has been to make more jobs for drivers. The 54- to 60-hour week almost universally used in the food industry generally has been reduced to a 48-hour week, or less, no matter whether the individual company elects to operate under the Motor Trucking Code or the transportation clause of the code for the particular industry within the food field.

Retail and wholesale milk route drivers, ice cream route drivers, bakery route drivers and others who receive a base wage plus a commission in accordance with the volume of goods sold or whose entire earnings are calculated on some commission basis have been classified as salesmen. As such, they do not come within the provisions of any of the codes.

Route Studies Necessary

But to all other truck drivers, the codes have meant a reduction in working time per week of from 10 to 16 hours. The first effect of the codes has been to take up the slack in the existing operations without major route changes. If this does not permit the drivers to come within the required working hours, apparently the fleet owners' next step would be to add more trucks and more drivers. This would mean more vehicles to do the same work and consequently higher unit costs.

Before taking such a step, many operators have begun an intensive study of each of their truck routes to determine how long the truck wheels were turning; what could be done to speed up loading and unloading times; whether a helper on the truck would increase its productivity and how any time wasted on the route could be recovered. Continued intelligent investigation of this kind is the only recourse against increased costs.

A clear picture of the truck's work. The wide marks tell when the truck has run. The spaces show when the truck has stood still.

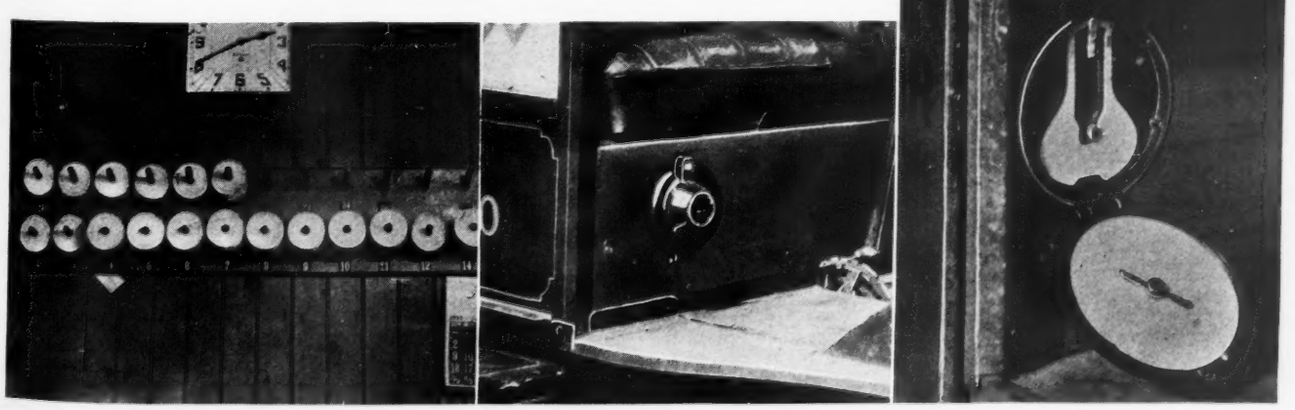
An efficient mechanical device to assist in such work is the Servis Recorder pictured on this page and made by the Service Recorder Co., Cleveland, Ohio. The instrument consists of an inclosed circular case inside of which is a clock mechanism and a pendulum with a stylus which makes heavy marks on a wax-coated paper chart only when the truck is in motion. The chart is revolved at clock speed, and is ruled off into time intervals, so that the marked chart tells when and how long the truck ran and stopped.

The case is locked to prevent tampering by drivers or others. The instrument must be mounted vertically, but can be attached to the truck body in any convenient location. It has no connection with the truck's driving mechanism.

Eliminating Idle Time

To the fleet supervisor, a study of the Servis Recorder charts indicates the ratio between running time and standing time or total trip time. The totals of standing and running time may be obtained easily without pencil figuring by means of a simple metal totaling device which is laid on the chart and rotated on its center.

When the ratio of standing time to total time is too high, the supervisor can tell from the charts how long the delays were and when they occurred and, by talking with the driver, take steps to reduce or eliminate them.



Left, eighteen trucks and each one on a peg. That's what this collection of charts means. The moral effect on drivers is strong, because anybody can see them. Center, recorder attached to seat riser. It must be placed vertically. It is not attached in any way to the truck's running gear. Right, recorder open and ready for insertion or removal of waxed chart showing the running time.

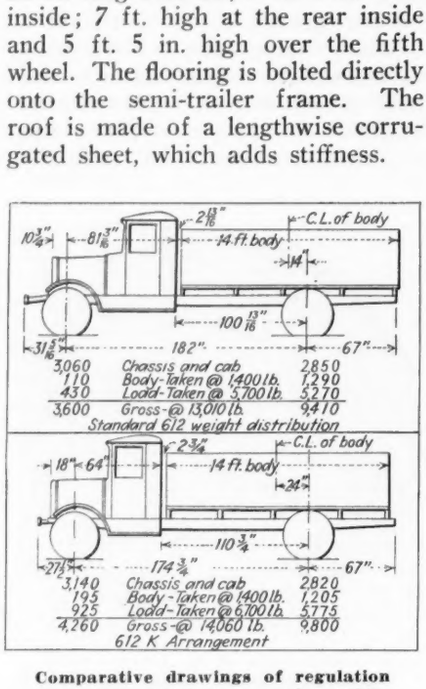
Welded Stainless Steel Truck Bodies

LIGHT WEIGHT, strength, durability and ability to withstand the action of corrosive agents are the important advantages of stainless steel for conventional motor-truck bodies. While stainless-steel truck tanks have been in use for some years, it is only recently that the use of such material in the development of lightweight railway cars has led to its employment in ordinary box-type bodies for commercial motor vehicles. The use of stainless steel permits a chassis with a given maximum capacity to add to its payload any reduction in the weight of the body, as compared with those constructed of heavier materials.

Among the pioneers in the development of the use of stainless steel for conventional truck bodies is the Edward G. Budd Manufacturing Co., Philadelphia, Pa., whose Shotweld type of construction is shown in the accompanying illustrations. The Shotweld body is made with corrugated side sheets of stainless steel which come in any lengths up to 70 ft. and are corrugated particularly in order that a lighter gage sheet may be used than would be possible in its flat form. Welds instead of rivets are used in the Shotweld body, producing in effect a one-piece body permanently welded together.

Stainless steel may be painted when it is necessary to conform to certain color combinations, although it is unnecessary to paint it for protective purposes.

The semi-trailer body shown in one of the accompanying illustrations is brand new and is featured by its extreme lightness of 2,520 lb. It is 25 ft. long over all; 7 ft. 4 in. wide inside; 7 ft. high at the rear inside and 5 ft. 5 in. high over the fifth wheel. The flooring is bolted directly onto the semi-trailer frame. The roof is made of a lengthwise corrugated sheet, which adds stiffness.



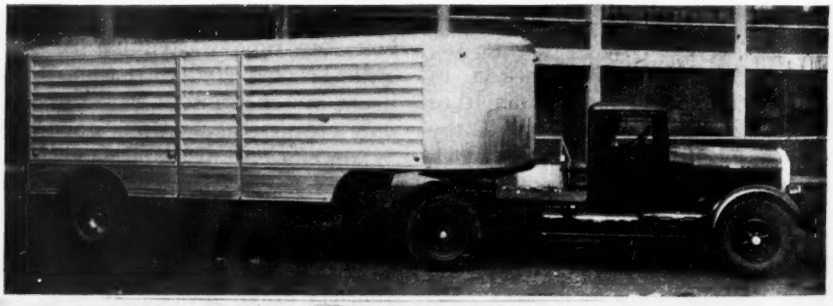
Comparative drawings of regulation and new modified K model White chassis showing how latter carry more weight on the front axle and permit larger gross load.

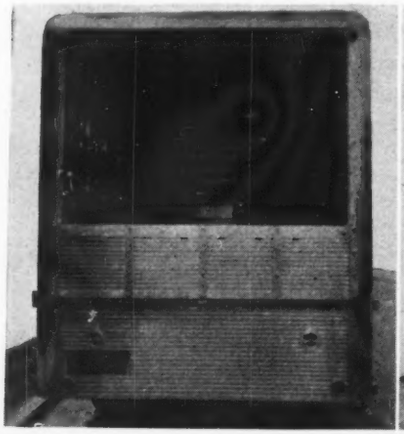
A Truck Prophecy Come True

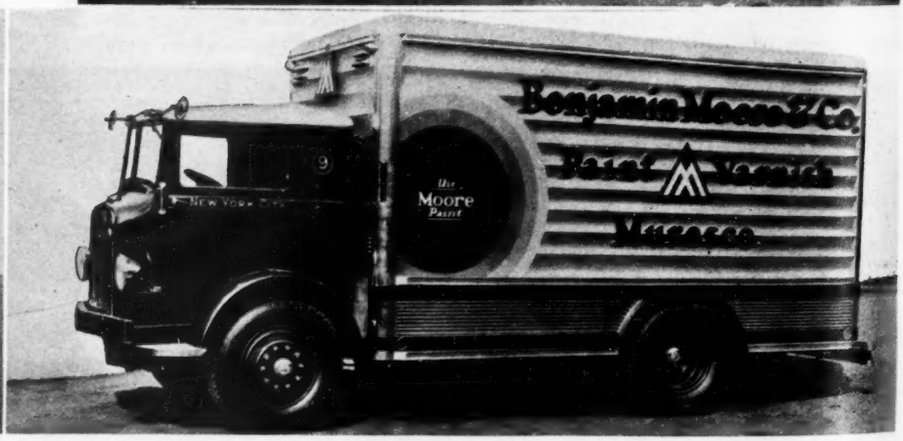
In its May, 1933, issue, p. 182, FOOD INDUSTRIES prophesied that the recent enactment of many state laws limiting gross weights, axle loads and over-all lengths would result in the design of trucks with a greater percentage of the total weight on the front axle.

That prophecy has come true in a recent announcement of the White Co., Cleveland, Ohio, that it now offers modifications of certain of its standard models to meet the requirements in many states of limited axle loads. The modified models are known as the K series and differ from the standard units in that a larger percentage of the total weight is carried on the front axle.

This weight transfer was made by moving the rear of the cab closer to the front axle through moving the front axle rearward relative to the engine or bringing the engine through the dash, or both. Positive air circulation keeps the cab comfortably cool.







Three views of the new Shotweld stainless-steel motor truck bodies as developed by the Edward G. Budd Manufacturing Co., Philadelphia, Pa. Top, right, a 25-ft. semi-trailer body weighing only 2520 lb. Above, rear view of the body shown at the lower right.

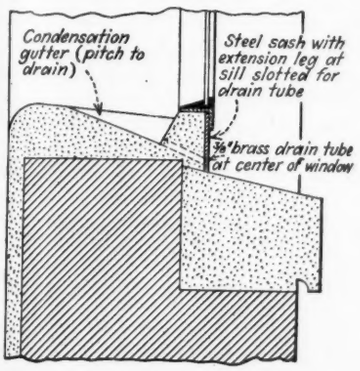
With stainless steel, paint is unnecessary for protective purposes but may be used for color combinations. The corrugated sides and the sheen of the unpainted metal give the body and the truck on which it is mounted a very distinctive appearance.

IDEAS . . . FROM PRACTICAL MEN

Pipe Drains Window Sills

In a food products plant one often finds moisture drippings on the inside surfaces of the windows. This causes an accumulation of water on the window sill and wets the wall and floor space in the vicinity.

To correct such a condition, a groove is frequently installed on the interior window sill. In extreme conditions, however, this groove becomes full of water and overflows onto the floor. To prevent the overflow and make the groove serve its purpose satisfactorily, a drain pipe should be extended from the groove through the exterior wall.


Condensation gutter (pitch to drain)
Steel sash with extension leg at sill slotted for drain tube
⅜" brass drain tube at center of window

The accompanying sketch illustrates such an arrangement in conjunction with a regulation type steel factory sash. It will be noted that the drain is set at an acute angle so that wind will not blow through the pipe during inclement weather.

VICTOR BUHR, *Equity Construction Co., New York, N. Y.*

How to Correct Steam Gages

In many cases where pressure gages are installed at a distance from the line of which it is desired to know the pressure, an appreciable error exists as a result of a static head of water in the gage connection. For example, the gage in Fig. 1 will read 10 lb. high, on account of the head of water in the line between the steam main and the gage. The weight of the column of water exerts a pressure of 0.43 lb. per foot and the vertical distance between the gage and the main is 23 ft. In this case it would be necessary to set the pointer of the gage back 10 lb.

In Fig. 2, the gage is shown above the main and will read 10 lb. low, because the line pressure must support the column of water in the gage

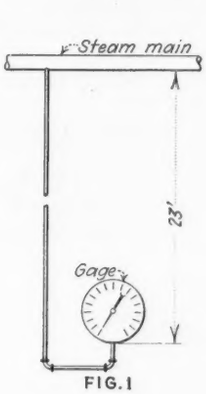


FIG. 1

FIG. 2

line. In this case the pointer of the gage must be set forward 10 lb.

Sometimes it is advisable not to disturb the gage but to mark the correction on the dial. However, when the gage is above the line there is danger of the pointer slipping because of pressure against the zero stop when steam is shut off.

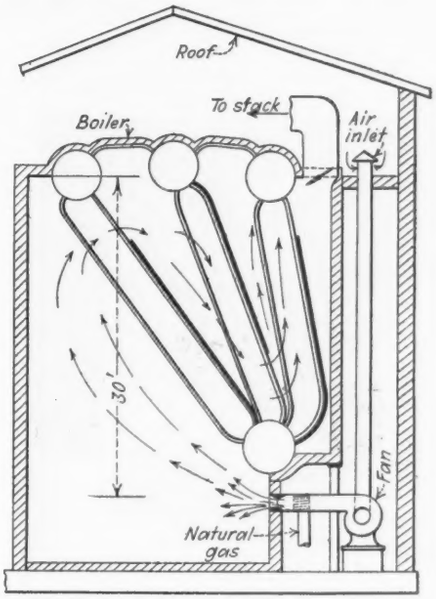
S. H. COLEMAN, JR., *Roanoke, Va.*

Air Intake at Top of Boiler

Two benefits are derived simultaneously by drawing the supply of air for a furnace from the space at the top of the boiler. This increases the combustion efficiency and at the same time relieves the excessive heat near the roof.

An application of this idea is shown in the illustration. The boiler is a 1,000-hp. unit, fired by natural gas and burning on the average $100 worth of fuel each day. The top of this boiler is near the roof, and the temperature there formerly ranged as high as 120 deg. F.; men who had to do any work at this point complained of the intense heat. The forced-draft fan is in the basement, where the temperature averages 60 deg. F.

After the inlet of the forced-draft fan was extended to the top of the



boiler, fuel consumption was reduced by more than 2 per cent, saving close to $1,000 a year. The saving was made possible because there is a gain in efficiency of nearly 1 per cent for every increase of 25 deg. F. in the flue-gas temperature.

N. T. PEF, *Chicago, Ill.*

Protective Finish for Cork

Cork-covered surfaces in cold-storage rooms can be made to last longer and look more attractive if they are finished properly. A good finish can be put on these surfaces with asphalt and enamel.

The first step in applying the coating is to spray an asphalt emulsion on the cork and allow it to dry for 48 hours. The air temperature in the room should not fall below 45 deg. F. during that time. The next step is to apply a coating of stiff asphalt with a trowel and fill all joints and recesses in the surface. When this is dry, additional asphalt is applied to give a uniform coating, ⅛ in. thick. This should be finished smooth and allowed to dry for 48 hours.

A decorative finish is applied then, white enamel being effective for this purpose. Two coats of white enamel will give a complete covering, providing a finish that will be lasting and of an attractive and sanitary appearance.

W. E. WARNER, *London, England.*

NOTICE · TO · READERS

Some of your pet ideas probably will qualify for this page. Put them in writing, make sketches where necessary, and send them in. Remuneration starts at $3 for each item accepted.

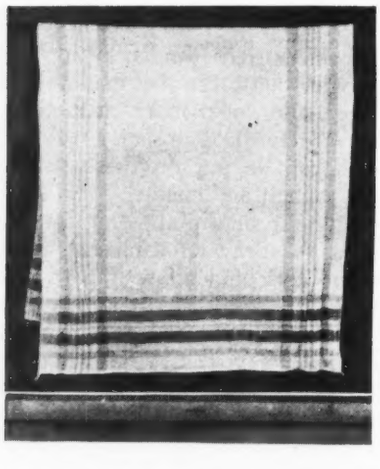
—THE EDITORS

NEW PRODUCTS—

—NEW METHODS

Fresh-Water-Turtle Soup

What is believed to be the first commercial use of fresh-water turtles is the manufacture and canning of turtle soup by Gates Packing Co. Inc., Fort Myers, Fla. With the choicer meat as a base, the soup is prepared and canned, and requires only heating to be served. The source of supply of meat is the turtle of the Everglades, where the animals live in large numbers.



A Sugar Bag—Also a Towel

A container with exceptional re-use value is being employed by National Sugar Refining Co. of New Jersey, New York, N. Y., to package Jack Frost granulated sugar. It is a 12½-lb. bag made from a well-known brand of toweling. When the seams are ripped, the bag becomes a kitchen towel 14½x30 in. The towel-bag is made with different colored borders. The illustration shows the bag after conversion into a towel.

Fortified Evaporated Milk

Evaporated milk containing vitamin D has recently been marketed in Chicago by Dean Milk Co., of that city. The vitamin D, extracted from cod-liver oil by the Zucker process, developed and controlled by Columbia University, does not affect the taste, odor or appearance of the milk. Because of the vitamin D and lime and phosphorus salts contained, which are essential to bone and tooth development, the milk is meant particularly for infant and child use.

The evaporated milk is packed in display cartons in both "tall" and "baby" sizes. The standard size, weighing 14½ oz. net, is to sell for not more than the average quart bottle of pasteurized milk.

French Dressing Base

Fresh, non-separating French dressing is assured with Salamix powder as a base, says the manufacturer, Salamix Co., Chicago, Ill. The powder contains paprika, mustard, sugar, salt, a dash of garlic, essential oils and other spices. To prepare the French dressing, the powder is mixed thoroughly with water, and the salad oil is added slowly while the mixture is constantly stirred. Vinegar or lemon juice is added to suit the taste. The resulting emulsion is said to be a perfect one. The powder may also be used with vinegar to make a meat or fish sauce or plain to flavor spaghetti.

The product is packed in individual 1-oz. cartons and in ½-lb. tins. The latter are inscribed with the name of Karl Peter Koch, designer. The patent on the product is pending.

"Fresh" Pineapple Juice

In view of the increasing consumer interest in the health value of fruits, Libby, McNeill & Libby, Chicago, are distributing canned Hawaiian pineapple juice. It is extracted from the fully ripened fruit on the Hawaiian plantations and canned there without the addition of preservative or sugar. It has the consistency of fresh orange juice and tastes entirely different from canned sliced pineapple syrup. It has been found to be a good source of vitamins A, B and C and five minerals essential to the body.

The juice was introduced at A Century of Progress on Hawaiian Day in twenty sampling booths about the grounds.

Candy-Flavored Ice Cream

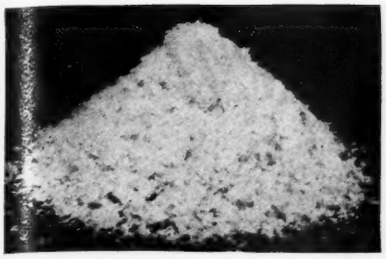
Ice cream flavored and enriched with butter crumble candy has been widely distributed by Pangburn Co., Fort Worth, Texas. The candy is a mixed nut butter spun with a crisp shell to protect the nut butter and to prevent melting out in ice cream. It is cut into oblong pieces about ½x½x¼ in. in size, which are sealed by the machine. Four pounds of these pieces is required for each 10-gal. lot of finished ice cream. The product has a delicate toasted flavor.

The manufacturer has introduced in the past several other flavors, such as pecan krunch, almond toffee, black walnut ron and peppermint stick.

Only the Beer Lacking

Beer and cheese wafers is the combination suggested by the novel package developed and marketed by Holland-American Wafer Co., Grand Rapids, Mich. A bag of Dutch Cheese Chips, one of the Dutch Twin family, is put into a collapsible paper "beer mug," the design of which includes a representation of overflowing foam. According to the manufacturer, the chips contain much more cheese than similar types of wafers and no artificial flavoring.

The packaging idea was developed by the bakers of the cheese chips. The patent on the package is pending.



Corn Flakes—Not With Milk

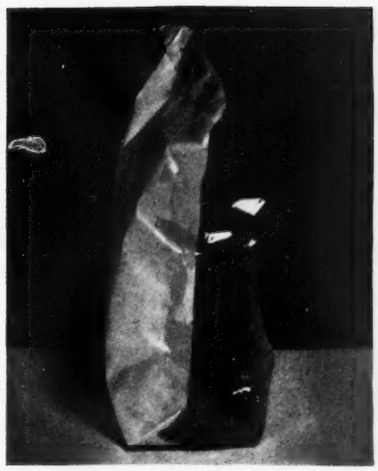
Corn flakes especially prepared for use in brewing processes are available from J. R. Short Milling Co., Chicago, Ill. Made from selected corn grits, the flakes are processed under high temperatures and pressures, so that they are almost instantly soluble in the mash. Hence, the conversion of starch to sugar is very rapid. High oil content in the corn, which causes destruction of the foam and cloudiness in the end product, is controlled by careful selection and processing of the raw material. Finally, the flakes are easily handled and require no precooking.

The product, called Readiflakes, is put up in 50-lb. bags.

Soluble Coffee Powder

Dry soluble coffee powder which will not grow stale is now being distributed by Magnus, Mabee & Reynard, Inc., New York, N. Y. To be used primarily for flavoring foods, it contains no grounds, yet has all the qualities of freshly made coffee. To prevent rancidity, the insoluble fat in the bean is removed with the grounds while the extract is being reduced to a powder. Two grams, or 0.07 oz., of the powdered coffee has a flavor equal to that of one cup of ordinary ground coffee, the manufacturer states.

The product, packed in 1-lb. tins wrapped with waxed glassine, may be used for fountain syrup, dessert powders, confectionery, ice cream, baked foods, and iced and hot coffee.

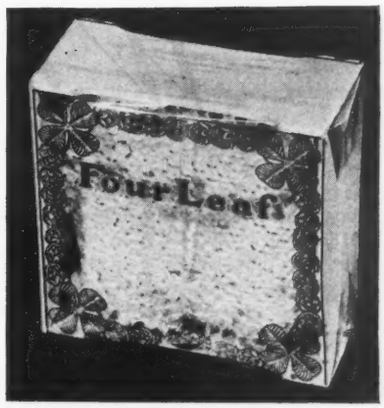


Half-and-Half Package

Bags for packaging bulk groceries made half of paper and half of transparent cellulose have recently been developed by Thomas M. Royal & Co., Philadelphia, Pa. The paper back serves as a slip sheet separating one bag from another in bundles, and speeds up handling and filling. It also provides a printing surface for advertising or branding. The transparent cellulose front affords a view of the contents when they are already packaged. The bag is strong and inexpensive, according to the manufacturer.

Quick-Frozen Crabmeat

Fresh crabmeat has been quick-frozen by the "Z" process for the first time for commercial purposes by American Crabmeat Co., Boston, Mass. New England crabs are boiled immediately after being caught, and are picked, packed and quick-frozen in a factory on the wharf. Before being frozen, the crabmeat is packed in paper containers holding 8 oz. net. On the carton are printed directions for handling the contents and recipes for their use. According to the American Z Corp., New York, N. Y., the product has been declared in excellent condition six months after being packed; when defrosted, the crabmeat possessed its original freshness, taste and appearance, but at least 50 per cent of the bacteria contained therein before freezing had been destroyed.

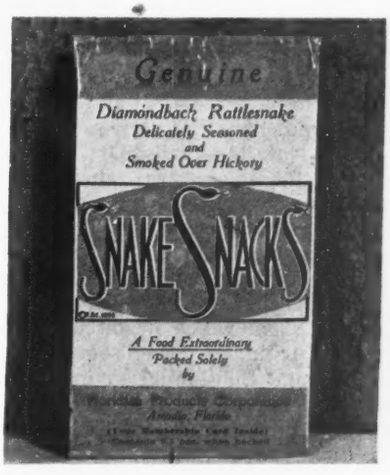


Protected Honey

Transparent cellulose has again been used effectively in wrapping an unprocessed product. The "Four Leaf" Western Clover honeycomb, boxed in the usual light-weight wood, is covered on all sides with the cellulose, on which the label and decoration are printed. The package, weighing 12 oz. net, is distributed by Mountain States Honey Producers' Association, Boise, Idaho.

Cinnamon-Sugar Topping

Cinnamon and sugar have been combined by Korn Konfectionery Kompany, Vancouver, B. C., into a topping for toast, waffles, cookies, buns and other baked foods. It is called Cinnasweet. Cinnamon and a specially prepared sugar are thoroughly blended in a mixing machine. The product is packed in sifter-top tins, holding 2½ oz. Recipes for using are printed on the band label around the package.



Genuine Diamondback

Latest among thirst provokers are "Snake Snacks," produced by Floridian Products Corp., Arcadia, Fla. They are made by seasoning and smoking rattlesnake meat over a hickory fire. The flakes resemble dry cereal in shape and color, and have a jerked-meat odor.

What Food Men Are Doing

New Deal Must Be Made to Work, 500 Ice Cream Men Are Told

"We know that a certain amount of government control is sure. We also know that we want the very least that is necessary. The only way that we can avert entire government control is to make the present plan, or some similar one, a success." This is what President George L. Boedeker told the group of more than 500 ice cream men who attended the annual meeting of International Association of Ice Cream Manufacturers, held in Chicago, Sept. 18-20.

After Mr. Boedeker had impressed upon the convention the necessity of cooperation under the New Deal, Dr. Clyde King spoke. Chief of the dairy division of A.A.A., Dr. King presented the viewpoint of the Administration. He said, in part, "Our task is to obtain, as soon as possible, a farm price that is equal to the pre-war parity between what farmers sell and what they buy. . . . We expect that every part of the industry will cooperate fully in bringing back these prices."

In commenting on trade agreements, Dr. King stated that the A.A.A. has taken the stand that every trade agreement must specify the right of the government to have access to all books and records of contracting parties.

If the New Deal fails, Dr. King remarked, there are two alternatives: either complete government control or a class and labor dictatorship.

Among the papers read at the convention, one of wide interest was that of C. T. Hubbell, president of Hydrox Ice Cream Co., in which he discussed experience with the single-service ice cream can. Substantial savings have been experienced with its use, he reported. In regard to relative hardening time with the paper can, Mr. Hubbell stated that operating experience indicated there was little, if any, difference.

Several other interesting papers were given. Among which were "The Ice Cream Industry's Opportunities in the New Industrial Order," by G. G. Kindervater; "New Facts About Quick-Freezing and Hardening," C. D. Dahle; "A New Type of Ice Cream", C. A. Iverson; "Gelatin and Gelatin Substitutes," P. S. Lucas; "A Method for Determining the Amount of Eggs in Ice Cream," B. E. Horrall; "Principles Governing the Crystalization of Lactose in Ice Cream," B. L. Herrington; "Scientific Facts Behind Making Ice Cream More Appealing to the Public," W. H. E. Reid, J. H. Erb, P. H. Tracy and A.C. Dahlberg.

G. G. Kindervater

G. G. Kindervater, Borden Co., was elected president of the association, succeeding George L. Boedecker. Other officers are W. R. Cammack, vice-president; Madison H. Lewis, treasurer; Robert C. Hibben, executive secretary.

Expects Sugar Agreement To Be Settled Soon

While the tempest in the sugar bowl has not entirely subsided, the Administration looks for an early settlement of the long pending basic sugar agreement. Settlement is expected to be effected through the revision of quotas for Cuba, the Philippines and the Virgin Islands.

The Cuban quota of 1,700,000 short tons is to be increased by 600,000 tons over a three-year period: 300,000 tons the first year, 200,000 the second and 100,000 the third. The first year increase is to be taken by a government body to be known as the Sugar Reserve Corp., financed either by the industry or by R.F.C. If Congress lowers the duty on Cuban sugar in its next session, the increases for the second and third years of the agreement will be void.

The Philippine quota will be increased to 1,100,000 tons, provided the Filipino legislature limits export production to 1,200,000 tons. The Virgin Islands quota probably will be 15,000 instead of 9,000 short tons.

The Sugar Reserve Corp. supposedly will carry all sugar in excess of the quantity required for consumption. Since the quantity of sugar produced for export will total about 7,000,000 raw tons, it is estimated that the reserve corporation probably will have considerably more on its hands than the increase of 300,000 tons allotted to Cuban producers.

Mark-up Provision Retained In Revised Master Code

While the Administration may not like it, the grocery industry considers the mark-up provision a vital part of its master code. And the code, as revised on Sept. 22, contains such a provision. It states that wholesalers shall sell at not less than 2½ per cent above cost, that retailers sell at not less than 7½ per cent above cost and that manufacturing retailers add the combined wholesale and retail minimum mark-up.

This revised code has been discussed in a meeting of the grocery men and it is reliably reported that the next step is a formal hearing.

The industry is anxious to have a code adopted, since some members feel that the modified form of the President's reemployment agreement, under which it is operating, is beginning to inflict undue hardship. Accounts receivable are backing up on the wholesaler, and eventually will back up on the manufacturer. J. Frank Grimes, president of Independent Grocers' Alliance, told grocery men attending the French Lick convention of A.G.M.A. that costs in retail groceries are up 33⅓ per cent.

Administration Rejects Code Submitted by Packers

Another proposed marketing agreement has bit the dust. This time it's the meat packers' code. The packers filed their idea of a proper agreement for the industry with the Administration on Aug. 31. The code provided fixing and allocation of supply and made provision for a processors' committee with permission to adopt marketing policies for livestock products.

A public hearing was held Sept. 8, at which Thomas E. Wilson stated that the

agreement would result in higher prices to livestock producers and permit the packers to effect economies and improve trade practices, eliminating excessive selling costs, price cutting, "chiseling" and unnecessary packaging costs.

But the Administration was not so enthusiastic about the code's possibilities. The powers objected that the proposed agreement provided no assurance of better prices to the farmer and lacked assurance against higher prices for the consumer. Furthermore, Dr. Howe, Consumers' Counsel, recommended that no agreement be approved releasing packers from anti-trust laws unless their accounts were opened to official inspection, to which the packers had strongly objected.

The Administration even went so far as to insinuate that the meat-packing industry had a bad record and that the agreement be considered in light of that record.

Plan Pork Tax of Two Cents

Pork packers will be called upon to pay a processing tax of 2 cents a pound on all hogs, beginning Nov. 1, if a plan announced Sept. 22 is approved by Secretary Wallace. This tax is part of a price-raising program developed in a three-day conference of the National Corn and Hog Committee with the A.A.A. officials. It is all designed to put more dollars into the pockets of the hog and corn farmers. One part of the plan provides for a bonus to corn growers agreeing to limit production in 1934 and 1935.

The program calls for a continuance of the plans for taking excess supplies of pigs. And the Administration's objective is to bring the price of corn and hogs up to pre-war parity prices.

No Eagle on Packages

Blue Eagle emblems will not be used on consumer packages by the grocery manufacturing industry. A resolution to this effect was passed at the French Lick (Ind.) convention of Associated Grocery Manufacturers of America, Inc., on Sept. 15.

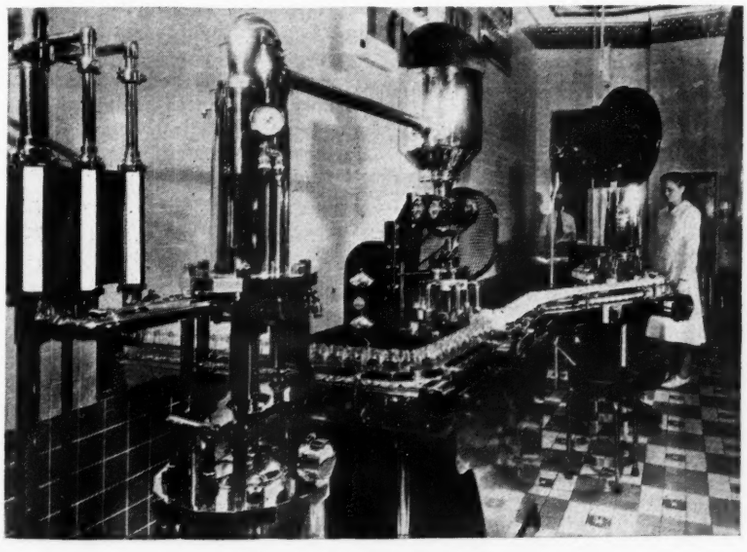
It was decided to comply with the Administration's request in this respect. Increased cost to the consumer involved in the labeling was advanced as a reason for the government's attitude. However, use of the Eagle is not unlawful.

The grocery manufacturers also resolved to display the emblem upon each shipping case and certify to distributors that they are entitled to use the Blue Eagle.

New Fisheries Section Set Up

So numerous are the problems of the fishing industry and of the present industrial set-up that the A.A.A. has established a separate section to handle them. The new section will be under R. H. Fiedler, chief of the division of fishing industries in the Bureau of Fisheries. Lawrence T. Hopkinson, of the Tariff Commission staff, and Robert S. Hollingshead, of the foodstuffs division of the Bureau of Foreign and Domestic Commerce, have been detailed to the new section.

It will be the task of these men to handle codes and other matters affecting the industry. Theirs will be the responsibility of providing for the welfare of this billion dollar industry.



Mayonnaise-Making Robot

Oil, vinegar, eggs and seasoning feed into this machine through the three tubes on the left—and mayonnaise comes out. The product empties into jars which pass on to the capping machine. It is a continuous process. The installation is in the Kraft-Phenix Cheese Corp. booth at A Century of Progress.

Bakers Win Two Victories

The business of selling bread and cake is a "common calling" and is not licensable. This decision was handed down by Justice Schenck, of the Supreme Court, Saratoga County, New York. The decision was the result of a suit brought against the City of Saratoga Springs by General Baking Co. and Ward Baking Co. to void a city ordinance providing for the licensing of peddlers of food products.

In Iowa, a group of bakers succeeded in having declared unconstitutional and invalid regulations of the State of Iowa which applied maximum variations and tolerances above the minimum weights of loaves of bread and which held bakers responsible for the weight of the bread after it had left their possession or control.

Hors d'Oeuvres

HERE'S AN IDEA for efficiency experts: An Englishman in Managua, Nicaragua, hired a blind man to grind corn on the night shift because the man needed to burn no lights.

•

A CHICAGO WOMAN discovered a dead mouse in a bottle of pop and sued for these damages: A nervous shock, a recuperative spell in a sanitarium and a trip to Europe. She asked the bottlers for $35,000. They offered her $1,500 out of court. She refused and the judge awarded her $1,000. Serves her right!

•

DR. GUSTAV EGLOFF, president of Chicago Chemists Club, says that drinking wine and beer is a pleasant way to get water into the system. Well, there's nothing like knowing all the excuses.

•

MISS AMERICA, 1933 model, was recently asked to pose for a coffee ad. She refused, saying that she always drinks cocoa. She deserves a Congressional Medal for valor, or something.

•

THE "BUCKET OF SUDS" appears to be coming back. Gottfried-Krueger Brewing Co., Newark, will test the practicality of marketing beer in tins.

•

STANDARD OIL comes to the rescue of the female figure fighters. It is now marketing Nujol as a salad oil, experimentally. Being a mineral oil, it adds no curves.

•

THE CHINESE like canned rattlesnake meat, but they can't stomach the bits of pimentos contained in the sauce. Having discovered this, Floridian Products Corp. is preparing a pimentoless product for them.

Brand Quits; King Reported To Be Leaving A.A.A.

A.A.A. seems to be undergoing a change in personnel. Charles J. Brand, coadministrator, has resigned, effective Oct. 1. And just as FOOD INDUSTRIES went to press, an unofficial report had it that Dr. Clyde L. King, chief of the dairy section, had tendered his resignation.

Mr. Brand apparently left to resume his position as executive secretary and treasurer of National Fertilizer Association, from which he was "borrowed" by the government. The reported reason back of Dr. King's move is a little different. Pressure on the part of the dairy farmers, who seemed to think they were not getting an even break, is alleged to have forced the step.

Chemists Discuss Beverages

Statements of interest to manufacturers of carbonated beverages, wine and beer were made by scientists at the annual meeting of American Chemical Society, held in Chicago in September.

Dr. H. E. Barnard, of Corn Industries Research Foundation, Indianapolis, said that the use of dextrose (corn sugar) in carbonated beverages gives the product a better body which retards the escape of the gas. This was found in extensive studies by J. H. Buchanan, research investigator of American Bottlers of Carbonated Beverages.

Dr. F. M. Dupont, Wahl-Henius Institute, Chicago, made the statement that the water used in the manufacture of beer is as important to the quality of the beverage as are the malt and hops. He pointed out that water is the substance which liberates the enzymes from the malt to render insoluble substances soluble and dissolve flavoring matter from the malt and hops. Water, Dr. Dupont indicated, has had an important part in making certain brews famous.

Dr. C. R. Downs, New York, reported that the time required to produce wine could be speeded up by about three years with malic acid. The addition of calcium malate, a malic acid and calicum compound, removes the excess tartar from the wine in a short time.

Distribution Cost Too High

Distribution cost has increased until it is absorbing an alarming proportion of the consumer's dollar for some commodities. This was one of the points stressed by Dr. Mordecai Ezekiel, economic adviser to Secretary Wallace and a member of the Roosevelt "brain trust" in his address before the Conference on Retail Distribution. This conference was held Sept. 18-19, under the sponsorship of the Boston Chamber of Commerce. Up to 1929, Dr. Ezekiel stated, distribution had increased its toll until retail prices were 70 per cent higher than in 1910, while returns to the farmer hand increased only 36 per cent.

E. H. Cooley, manager of Massachusetts Fisheries Association, told the group that distributing agencies have not taken full advantage of technical developments in the preservation of fish and other perishables. Highly perishable foods could be sold in large volume with proper distribution and better publicity, he explained. Mr. Cooley seemed to think that manufacturers of quick-frozen foods are not capitalizing their opportunity to the fullest extent.

Price-fixing was much discussed. Independent distributors favored outlawing loss leaders, while the chain men called for unstricted freedom, contending the consumer is entitled to buy at the lowest price at which anyone will sell.

Olin M. Jacobs

New secretary of National Confectioners' Association, who succeeds Frank S. Records. Mr. Jacobs is also managing director of the association. He was secretary of New England Manufacturing Confectioners' Association for 8 years. O. E. Lomis takes over that position.

CONVENTIONS

OCTOBER

2-6—National Safety Council, 22d annual, Stevens Hotel, Chicago. Henry J. Mineur, Borden Co., New York, N. Y., food session general chairman.
9—National Association of Wholesale Pie Bakers, Hotel Sherman, Chicago.
9-11—National Cooperative Milk Producers' Association, annual, Morrison Hotel, Chicago. Charles W. Holman, 1731 Eye St., N. W., Washington, D. C., secretary.
9-13—American Bottlers of Carbonated Beverages, annual, Jefferson County Armory, Louisville, Ky. Junior Owens, 726 Bond Bldg., Washington, D. C., secretary.
9-14—American Bakers' Association, annual, Hotel Sherman Chicago. Tom Smith, 1135 Fullerton Ave., Chicago, secretary.
14-17—National Poultry, Butter and Egg Association, Hotel Sherman, Chicago.
16-18—Associated Coffee Industries, Drake Hotel, Chicago.
20-24—Institute of American Meat Packers, Drake Hotel, Chicago.

NOVEMBER

14-17—National Association of Ice Industries, Roosevelt Hotel, New Orleans. Leslie C. Smith, 228 N. LaSalle St., Chicago, secretary.
29-Dec. 1—Southern Association of Ice Cream Manufacturers, 10th annual, Hotel Roosevelt, New Orleans.

Food Industries Are Troubled By Striking Workers

Inspired by their new importance under N.R.A., workers are more than ever resorting to strikes to improve their position in industry. About 800 grain workers, members of the Grain Elevator Employees' Union and Grain Shovelers' Union, Buffalo, N. Y., were on strike for thirteen days. They returned to work Sept. 14, when the elevator operators signed a contract recognizing the unions and granting some other concessions. Under the terms of the contract the men will work a 40-hour week with a guaranteed minimum of 65 cents an hour and a maximum of 75 cents an hour under a modified code set up under the N.R.A.

A blockade of foodstuffs by truck drivers nearly resulted in a severe food shortage in Philadelphia. Fortunately, the 12,000 drivers involved agreed to lift the ban on perishables.

Strikes in fifteen cranberry bogs in Massachusetts and in twenty pecan shelling plants in Chicago involved 1,200 and 1,000 workers, respectively. Both bands of strikers have in effect unionized locally in order to command higher wages.

Women shrimp packers in Mississippi went on strike, and boatmen demanded that factories on the Gulf of Mexico buy from all boats instead of operating their own.

In California canneries, 16,000 employees were on the point of striking in order to obtain a 30 cent hourly rate for piece work.

Cost Increases Computed For Tomato Packers

Tomato packers worrying about increased cost under the N.R.A. will not be comforted greatly by recent cost figures issued by Tri-State Packers' Association, Inc. A comprehensive analysis of data submitted by representative members of the association indicates that from 6¼ to 60¼ cents is added to the cost of tomatoes per dozen cans.

The following table breaks down these costs (in cents) for the different size cans, figures being for a dozen cans:

Items	No. 1 Cans	No. 2 Cans	No. 2½ Cans	No. 3 Cans	No. 10 Cans
Raw Stock....	2.02	3.75	5.51	6.26	19.73
Labor.....	1.12	2.07	3.04	3.46	10.89
Peeling.....	0.81	1.50	2.21	2.51	7.89
Cans.....	0.00	0.00	0.00	0.00	0.00
Boxes.....	0.48	0.88	1.29	1.47	4.63
Baskets.....	0.05	0.10	0.15	0.17	0.53
Labels.....	0.11	0.20	0.29	0.33	1.05
Fuel.....	0.05	0.10	0.15	0.17	0.53
Card NRA...	0.50	1.00	1.00	1.00	4.00
Overhead.....	0.54	1.00	1.47	1.67	5.26
Insurance....	0.05	0.09	0.13	0.15	0.47
Interest.....	0.17	0.32	0.47	0.53	1.68
Brokerage....	0.24	0.44	0.65	0.73	2.31
Swells.....	0.03	0.06	0.09	0.10	0.32
Discount.....	0.09	0.17	0.25	0.28	0.89
Total.....	6.26	11.68	16.70	18.83	60.18

Howe Wants to Know Why

Dr. Fred C. Howe, consumers' counsel of A.A.A., is on his high horse again—or yet—about bread prices in certain cities. While approving of the average price for the entire country, Dr. Howe wants to know from American Bakers' Association why the price is one cent or more above the national average in eight cities. The cities referred to include Atlanta, Charleston, Mobile, San Francisco, Savannah, Scranton, Seattle and Newark.

The average price for the country, based on a study of 49 cities as of Aug. 29, is 7.6 cents for a pound loaf. This represents a 1.2-cent advance from Feb. 15.

In a statement issued Sept. 8, Dr. Howe made it known that the government is now checking the miller's, shipper's, transporter's and wholesaler's charges against the price the farmer is getting for wheat.

Food Men on Parade

That the food industries in metropolitan New York are behind the N.R.A. there is no doubt. Some 25,000 members of the various food companies marched up Fifth Avenue on the afternoon of Sept. 13 in the parade of 250,000 that lasted from noon until midnight and set a new world's record for public demonstrations.

Frederic H. Frazier, chairman of General Baking Co., acted as marshal for the food group. C. M. Chester, Jr., president of General Foods Corp., acted as vice-chairman of the food group, in charge of manufacturers of food products.

Outstanding figures in the respective food industries led their sections. Ralph D. Ward, Borden Co., led the dairy section; Fred Kraft, Kraft-Phenix Cheese Corp., the cheese manufacturers; Gordon Lamont, Lamont Corliss & Co., the cocoa and chocolate group; Charles D. Bruyn, National Sugar Refining Co., the sugar industry; M. Lee Marshall, bakers; Frederick T. Fisher, Corn Products Refining Co., the corn products industry; Roy E. Tomlinson, National Biscuit Co., the cracker manufacturers; Thos. H. McInnerney, National Dairy Products Corp., the milk and cream division.

The meat packing industry was well represented. Walter Blumenthal led the city dressed meat division and V. D. Skipworth, the prepared meats industry. About 1,800 members of the meat industry marched.

Foods First on Radio

Food industries spent more money on radio network advertising in 1932 than any other group of industries—$11,297,227. This figure is given by National Broadcasting Co. Since 1927, when food industries spent $427,830, the expenditure for network advertising has steadily increased, the greatest percentage of increase coming in 1929 and 1930—176 and 160 per cent, respectively.

Of the total amount spent in 1932, the division by groups was as follows: cereals and flours, $4,851,719; beverages and dairy, $3,164,483; canned goods, $1,697,805; food stores, $857,974; condiments and relishes, $725,423.

Standard Brands, Inc., has spent since 1928 more than $4,000,000; General Foods Corp. and Quaker Oats Co. have spent more than $2,500,000, the former since 1927, the latter since 1929.

Butter Becomes Loss Leader

A casual suggestion at an A.A.A. conference that there be a nation-wide sale of butter at cost plus 2 cents was taken so seriously by many in attendance that the plan was widely adopted. It was not long, however, before independent grocers began to protest loudly. Soon they were joined by the big creameries. Paradoxically, their outlet is through the small independent grocers, while the chains buy most of their butter from the smaller creameries. As a result the smaller creameries lined up with the chain stores in urging the continuance of the cost-plus-2-cents sale of butter.

The need for reducing the surplus is greater since the general realization that there is a string tied to Secretary Wallace's proposal to allot $30,000,000 for butter purchases. This $30,000,000 is not to become available until the industry has worked out a plan that promises to meet the surplus problem successfully. That condition is going to be hard to meet.

R.F.C. loans have relieved the acute situation among the cooperatives. This, together with the recent improvement in prices, has given the farmer-owned institutions a new lease on life.

The NRA Army Followed—250,000 Strong

This float, carrying Miss Liberty and Miss N.R.A. led New York's great national recovery parade, with its 25,000 food industries representatives.

Concentrates

Large dairy companies are willing to compromise on a 1-cent store-price differential for bottled milk, according to a rumor current at the Chicago convention . . . No change in price differential is being considered by the committee drafting the code for the New York milk shed, it is reported . . . The Food Industries Administrative Board, representing major food industries, has pledged active cooperation with A.A.A. in obtaining pre-war prices for farmers.

As an aid to driving out racketeers, brewers and wholesalers of beer in New York State must file a record of all employees, including their fingerprints, with the State Alcoholic Beverage Control Board . . . England has marketing agreements covering bacon and pigs and is putting into effect such a scheme for the dairy industry . . . Casein may be bleached by a process discovered by Land O'Lakes Creameries and now being perfected by experimental work.

Guatemala coffee growers have discovered that a pigment for paint can be made from ground coffee beans . . . Mushrooms are being grown in an abandoned coal mine near Pittsburgh. In four months, 14,000 lb. was gathered from 5,000 sq.ft. of beds . . . National Chain Store Association was scheduled for dissolution on Sept. 30 to permit a federated council of the various trade groups to be formed.

Illinois officials are attempting to eliminate outdoor display of produce at stores and open-air markets . . . A 10-cent tax on each pound of malt and each gallon of wort has been placed in effect in Ohio . . . American lard, which has practically monopolized the British market, is facing increasing competition from the Danish product, which has been improved . . . Fourth annual Packaging Exposition will be held in the Hotel Astor, New York, March 13-16.

MEN . . . JOBS . . . AND COMPANIES

Industry

ARMOUR & Co., Chicago, withdrew its plan on capital reorganization on account of heavy opposition among minority stockholders.

E. & J. BURKE, LTD., is erecting a completely modern brewery in Long Island City, N. Y., which will cover an entire city block.

CANADA DRY GINGER ALE, INC., has concluded arrangements with the J. Chr. G. Hupfel & Co., Inc., whereby a new company, known as J. Chr. G. Hupfel Brewing Corp., will be organized. Modern equipment will be installed immediately in the Hupfel Brewery in Manhattan, giving the plant a 350,000 bbl. capacity. Canada Dry will distribute the beer.

CAMPBELL SOUP Co., Camden, N. J., announces the largest advertising campaign in its history. Magazine advertising is increased by the addition of many more pages and newspapers in several key cities will carry half-page advertisements weekly. The company reports a marked increase in business.

CLINTON CORN SYRUP REFINING Co., Clinton, Iowa, has changed its name to Clinton Co., that being the name by which it has been known in the trade. A subsidiary will be known as Clinton Sales Co., Inc.

FOODS, INC., New York, has formed Bahama Foods, Inc., to acquire marketing rights for the United States of green turtle products of Gulf Stream Food Products Corp.

A. GUSMER, INC., Hoboken, N. J., announces removal to a new plant and offices in Hoboken, the change being made to meet an increase in business.

HECKER H-O Co., INC., Buffalo, N. Y., starts its fall consumer advertising drive with three radio programs. One will be broadcast over 13 eastern stations, another over 12 west coast stations, and a third over Station WOR in New Jersey.

H. J. HEINZ Co., Pittsburgh, recently launched a new type of advertising campaign in 108 newspapers and several magazines. The magazine advertising consists of pages resembling the regular editorial pages of the publications and suggesting new dishes. The newspaper ads comprise a group of several advertisements of single products.

HOFFMAN BEVERAGE Co., will erect a completely modern brewery in Newark, N. J.

KINGSBURY BREWERIES Co. plans a $1,000,000 brewery on the west coast, probably in Los Angeles.

LIEBMANN BREWERIES, INC., Brooklyn, N. Y., may lose its "Rheingold" beer trademark. Weisbrod & Hess, Philadelphia brewers, claim to have registered the trademark in 1898.

CHRISTIAN MOERLEIN BREWING Co., INC., Cincinnati, plans to erect a $5,000,000 brewery. The plant will have an annual capacity of 500,000 bbl. Joseph H. Assel will be president and general manager.

NATIONAL LIVE STOCK & MEAT BOARD, Chicago, announces that 37 schools have already been scheduled for its 1933-4 meat cookery programs.

NATURAL FOOD PRODUCTS Co., Orange, Calif., was formed this summer to pack citrus juices by the Stephens process. The officers are reported to be F. T. Elliott, president; Milo R. Daughters, on leave of absence from Frosted Foods Co., Inc., vice-president; and J. P. Ricci, plant superintendent.

NISER ICE CREAM Co., Cincinnati, has acquired a part of the former Kahn packing plant there as an expansion of its business.

PILSNER BREWING Co., Seattle, will construct a $300,000 plant in Portland, Ore. The plant will have a 250-bbl. daily capacity.

ROANE SUGARS, INC., New Orleans, will reopen the Loisel sugar mill there, with Lee Roane as superintendent. Having been closed for ten years, the mill will be reequipped to a capacity of 50,000 tons annually.

SPRAGUE, WARNER & Co. recently opened Super-Service Stores along the North Shore district of Chicago. The company has organized leading merchants of this district into the newest of voluntary groups — the Super-Service Stores.

UNITED PRUNE GROWERS OF CALIFORNIA have budgeted twice as large a sum for this year's advertising campaign as for last year.

WESTON BISCUIT Co. expects to double the capacity of its plant at Passaic, N. J. When the announcement was made, the plant was two weeks behind in orders.

PERSONNEL

J. H. DEMPSEY, superintendent of the Pittsburg plant of F. E. Booth & Co., has resigned to become general manager of Pittsburg Canners, Inc., which has a new plant at Pittsburg, Calif.

R. H. ELIEL, College Inn Products, Chicago, is president of Chop Suey Products Association, a new organization. S. Ohki, Columbus, Ind., is vice-president.

HUGH M. FOSTER has been appointed full-time assistant to Paul S. Willis, president of Associated Grocery Manufacturers of America. Mr. Foster was associate editor of *Grocery Trade News* and from 1927 to 1930 he was grocery editor of the New York *Journal of Commerce.*

EDWIN T. GIBSON has been elected president of Baker-Bennett-Day, Inc., subsidiary of General Foods Corp. Mr. Gibson succeeds A. S. Iglehart, vice-president of General Foods in charge of manufacturing, who has also been serving as president of Baker-Bennett-Day. Thomas M. Rector, formerly general manager of this subsidiary, will now devote most of his time to engineering work for General Foods.

F. M. LILLIE, formerly of H. J. Heinz Co., Pittsburgh, and former advertising manager for American Fruit Growers, is now maintenance manager for the American Institute of Food Distribution, Inc., New York.

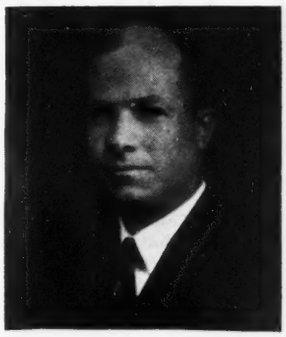
FRANK W. LOUCKS, general manager of branch houses of Armour & Co., has been named manager of the company's New York district to succeed the late U. P. Adams. C. G. Briggs succeeds Mr. Loucks at the Chicago office.

IRVING PHILLIPS has been appointed vice-president in charge of sales and advertising of Canada Dry Ginger Ale, Inc. Mr. Phillips was formerly Eastern sales manager for the company.

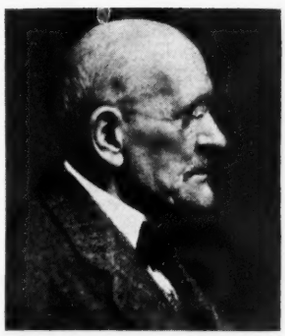
EMORY J. PRICE, who has been in charge of the personnel department of Pillsbury Flour Mills Co., Minneapolis, recently was made a director. M. H. Matschke, credit manager, C. C. O'Donnell, assistant treasurer, and J. I. Beatty, auditor, also were elected directors. Howard W. Files, general sales manager, and A. E. Mallon, export manager, were named vice-presidents.

R. K. PYRON has been elected manager of Union County Creamery at

EDWIN T. GIBSON
President of Baker-Bennett-Day



DONALD K. TRESSLER
Joins experiment station staff



BARNIM F. ORTMAN
Oldest head miller dies at 85

PAUL C. SMITH
Made a vice-president of Swift & Co.

New Albany, Miss., succeeding E. R. Atkinson.

R. J. RINEY is now vice-president of General Sterling Brewers, Evansville, Ill. Herbert Walker is comptroller.

CHARLES H. SCHWEGMAN has been elected president of Parkway Brewing, Inc., Cincinnati. Other officers include George Sickles, D. C. Corbin and Arnold S. Mann, vice-presidents, and Harry H. Shafer, secretary-treasurer.

PAUL C. SMITH recently was named vice-president of Swift & Co., in charge of the beef, lamb and veal, cattle buying, calf buying and sheep buying departments. Mr. Smith went to work for Swift & Co. in 1913 at Kansas City.

JOHN TERRELL, general factory superintendent of Two Star Confectionery Co., New York, since last June, recently resigned to go with Shapiro Candy Mfg. Co., Brooklyn.

DONALD K. TRESSLER resigned as chief chemist of Birdseye Laboratories, Gloucester, Mass., to become chief of research of the Division of Chemistry, New York State Agricultural Experiment Station, Geneva.

CHARLES J. WIELAND succeeds E. D. Walmsley as president of the Illinois division of Borden Farm Products Co., the latter becoming chairman of the board. Mr. Wieland is president of Wieland Dairy Co., Chicago.

DEATHS

WALTER C. BARTLETT, 71-year-old retired manager of National Candy Co., St. Louis, died Sept. 12. He founded Bartlett Candy Co. in 1891.

CHARLES J. BAUER, vice-president of St. Louis Coffee & Spice Mills, which he helped to organize 34 years ago, died recently. Mr. Bauer was born 61 years ago in Germany.

HENRY CARTAN, 75, one of the founders of Hawaiian Pineapple Co., died Sept. 18, in San Francisco.

LEON O. CUSHMAN, manager of the Brooklyn plant of Cushman & Son, Inc., for several years, died recently in Ridgefield Park, N. J., at the age of 48.

HEZEKIAH T. EMERSON, a first cousin of the poet Ralph Waldo Emerson and a millwright for 52 years, most of which was spent in the employ of Northwestern Consolidated Milling Co., Minneapolis, died Sept. 11. Mr. Emerson was 88; he had retired in 1924.

THOMAS B. HARBISON, vice-president of Harbison's Dairies, Philadelphia, died Sept. 7 at the age of 69.

CHARLES T. JOHNSON, general manager of Home Mill & Grain Co., Mount Vernon, Ind., died in St. Louis, Sept. 12. Mr. Johnson was a director of Millers' National Federation for about 20 years. He was a pioneer in the manufacture of self-rising flour.

FREDERICK H. LUDEKING, manager of Armour Beef Co.'s Elizabeth (N. J.) plant for several years, died Sept. 8. He was born in Germany 68 years ago.

H. B. MCNEAL, 65, president of Pittsburgh Pretzel Co. and vice-president of Pennsylvania Pretzel Bakers' Association, died Sept. 13 of acute indigestion.

BARNIM F. ORTMAN, 85, oldest active head miller, died Sept. 18. Mr. Ortman had been head miller for George Urban Milling Co., Buffalo, N. Y., for 52 years. It was 70 years ago, when buhr stones were used, that he began his career as miller.

EDWARD STYLES POLLEY, president of the Delancey Milk & Cream Co., Brooklyn, N. Y., died Sept. 17. Mr. Polley, who was 57, organized Delancey Co. in 1917.

PIETRO REALMUTO, president of Roman Macaroni Co., Long Island City, N. Y., died Sept. 19. Mr. Realmuto was 62. He was the originator of "five-minute" spaghetti.

WILLIAM A. WALDOCK, founder of the Waldock Packing Co., Sandusky, Ohio, died there Aug. 25. He was 67.

Associated Industries

ALLIED DISTRIBUTION, INC., has been organized at Chicago as a nation-wide group of associated public warehouses.

DR. LLOYD A. HALL, of Chicago, and ROGER W. TRUESDAIL, director of Truesdail Laboratories, Inc., Los Angeles, announced a recently formed association between these two laboratory groups.

MAGNETIC MANUFACTURING CO., Milwaukee, Wis., will license the following companies to build its spout type magnetic separators: Richmond Mfg. Co., Lockport, N. Y.; A. E. Jacobson Machine Works, Inc., Minneapolis; Bryant Engineering Co., Port Huron, Mich.

NATIONAL INSTITUTE OF USED MACHINERY & EQUIPMENT DEALERS has been formed in New York with Charles A. Simmons as president. Headquarters are at 57 Chambers St.

PACKAGING MACHINERY MANUFACTURERS' INSTITUTE, INC., has been organized with H. H. Leonard, Consolidated Packaging Machinery Corp., Buffalo, as president. A fair trade code has been completed.

A. O. SMITH CORP., Milwaukee, manufacturer of glass-coated steel pipe lines, pressure vessels, and other equipment, announces glass-lined storage and aging tanks for beer.

BUSINESS TRENDS

Dairy Products High in 1932; Record Butter Output

More creamery butter, more evaporated milk, and less ice cream were manufactured in 1932 than in 1931, as indicated by the annual dairy report of the Bureau of Agricultural Economics.

Production of creamery butter last year was the largest on record, totaling 1,694,132,000 lb. by 4,424 factories, compared with 1,667,452,000 lb. by 4,397 factories in 1931. Evaporated milk production by 135 factories was 1,570,612,000 lb. last year, compared with 1,428,993,000 lb. by 134 factories in 1931.

Production of ice cream last year aggregated 160,138,000 gal. by 3,619 factories, compared with 208,239,000 gal. by 3,676 factories in 1931. American cheese made of whole milk totaled 370,743,000 lb. by 2,274 factories last year, compared with 374,648,000 lb. by 2,260 factories in 1931.

Minnesota factories turned out the largest quantity of creamery butter last year, according to comparisons by states, the output totaling 281,659,000 lb. by 821 factories, compared with 284,270,000 lb. by 840 factories in 1931.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Prices Up Sharply

Inflation talk and the consequent buying of futures have turned commodity prices sharply upward from their hesitant position of August and early September.

Price levels beyond the power of the consumer to buy consistently, particularly those for foods, and industry's uncertainty in proceeding under N.R.A. conditions have caused further slowing of business activity.

The Business Week Index of business activity stands at 62.6 per cent of normal for the week ending Sept. 16, the lowest point since the week ending July 15, when the 1933 high—69.1—was set.

Wholesale prices reported by U. S. Department of Labor indicated the gradual rise of commodity prices during the week ending Sept. 16 and an increase of more than one per cent for 784 price series since Aug. 12. Farm products prices declined 0.7 per cent, while manufactured foods increased 0.1 per cent during the weeks ending Aug. 19 to Sept. 26.

All commodities during the month ending Sept.23 gained 3.5 per cent in the weighted price index of the New York *Journal of Commerce;* grain rose 1.7 and food 4.5 per cent.

A. & P. tonnage sales for five weeks ending Sept. 2 were 6.5 per cent less than in the same period last year, but 19.8 per cent more than for the four-week period ending July 29.

Hog Program Strikes Snag; Sows Marketed Slowly

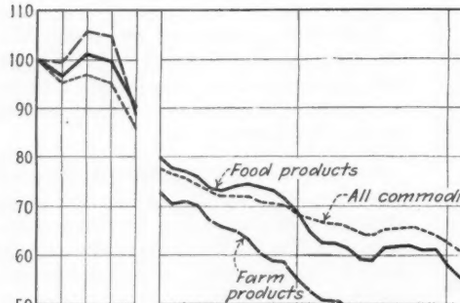
Although pigs have been moving to market at a high rate under the emergency marketing program, the picture is not as bright for sows.

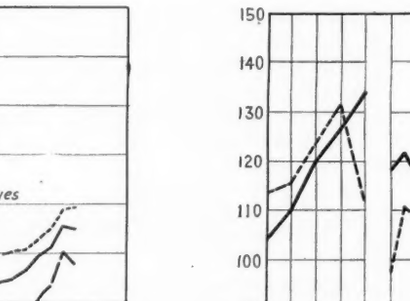
Reports indicate that many farmers are deliberately holding back sows. This will have a strongly adverse effect upon the success of the marketing problem. The aim of the Administration is to effect an increase of from 25 to 30 per cent in prices, but this is based upon the sale of the maximum of 1,000,000 sows as well as 4,000,000 pigs.

Four million fewer 1933 spring pigs on the market next winter would mean about 600,000,000 lb. less of pork and lard, but the sale now of 1,000,000 sows would reduce the marketing of pork by about 1,000,000,000 lb.

Latest reports from Chicago indicate that 6,000,000 pigs and 100,000 sows will have been marketed during the emergency period. This excess of pigs marketed will not offset the shortage of the quota for sows. There is strong speculation that to do the job right $50,000,000 will be allotted to extend the hog reduction program, in addition to the $17,210,000 already spent.

The price of hogs has increased with government buying, a top of $5.45 being reached on Sept. 22, the highest since May 18.


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
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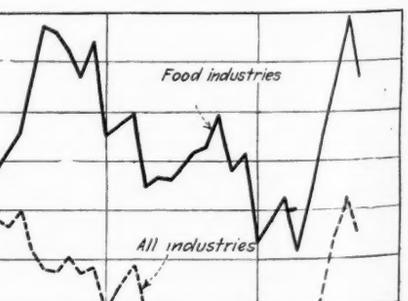
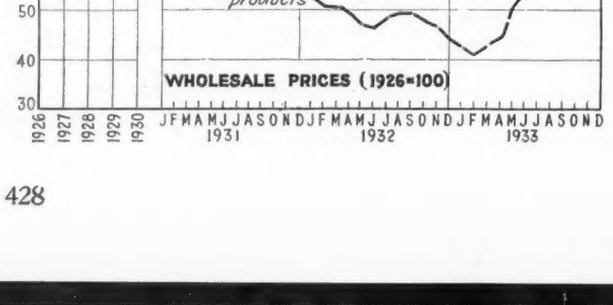
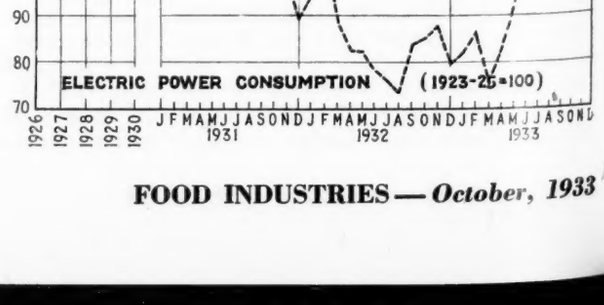

FACTORY PAYROLLS (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


Food products
All commodities
Farm products
WHOLESALE PRICES (1926=100)
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933


Food industries
All industries
ELECTRIC POWER CONSUMPTION (1923-25=100)
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933

Prune Crop, Carryover, Sold

The California prune pool, organized early last year for a three-year marketing plan to dispose of 80 per cent of all prune production in California, announces that practically the entire 1932 crop has been sold, together with a 36,000-ton carryover from 1931.

Control of off-grade prunes, educational campaigns and other modern marketing methods have resulted in a steady advance in prices for dried prunes "in the face of a general decline in all commodity prices, particularly farm products." Definite stabilization of prices at a figure profitable to the grower is anticipated.

Included in the work being done by the pool is a campaign among bakers to extend the use of pitted prunes in making prune bread. Requiring less sugar and retaining freshness longer, this bread is said to be gaining rapidly in popularity.

Crop Forecast Indicates Smaller Basic Crops

Production of basic crops will be appreciably below that of last year, a forecast issued Sept. 11 by the Bureau of Agricultural Economics indicates. The forecast places the 1933 total wheat harvest at 506,500,000 bu., as compared with 726,800,000 for last year. For spring wheat, the figures are 166,200,000 bu. this year and 264,600,000 in 1932.

Canada's wheat crop will be only 282,700,000 bu., whereas it amounted to 428,500,000 a year ago. In Europe, the total for 29 countries is some 75,000,000 bu. higher than for 1932. However, smaller crops are predicted this year in Argentina and Australia. Total world output is expected to be somewhat less than in 1932.

This year's domestic corn crop is much smaller, being estimated at 2,285,000,000 bu.; it was 2,875,500,000 last year.

A significant change occurs in the potato yield. Down 41 per cent from normal, the potato crop will be 284,000,000 bu. A 20 per cent drop from normal is forecast for peaches, the yield being 45,600,000 bu.

The following table gives 1933 and 1932 production figures as of September for other domestic crops:

	1933	1932
	(millions)	
Rye (bu.)	23.1	40.4
Buckwheat (bu.)	7.1	6.8
Rice (bu.)	35.2	39.4
Beans (dry edible) (100-lb. bags)	9.8	10.2
Peanuts (for nuts) (lb.)	912.0	1,002.0
Apples (bu.)	149.0	141.0
Pears (bu.)	21.8	22.0
Grapes (tons)	1.7	1.2
Sweet Potatoes (bu.)	69.1	78.5
Sugar Beets (short tons)	10.3	9.07
Hops (lb.)	35.5	24.1

Decrease in Canned Oysters

Domestic production of canned oysters during the 1932-33 season decreased in volume by 39 per cent and in value by 36 per cent as compared with last year, according to the Bureau of Fisheries. The total pack in the 1932-33 period was 241,770 standard cases of 48 No. 1 5-oz. cans, valued at $668,387.

Contrary to the trend, the Washington oyster canning industry, which is only about three years old commercially, produced more than 2½ times as much as in the previous year.

Stocks of canned oysters in the hands of packers at the end of the season amounted to 57,732 standard cases, as compared with 91,572 cases at the end of the previous season.

With the opening of the new season it is announced by the Bureau of Fisheries that for the third year seed oysters have failed to "set" in Long Island Sound, incurring a financial loss of $3,000,000 to Connecticut growers.

INDICATORS

SHEFFIELD FARMS CO., INC. has increased salaries from 10 to 12 per cent; Borden's Farm Products Co. Inc., instituted a 12 per cent rise; Curtiss Candy Co. boosted office force salaries 5 per cent. H. J. Heinz Co. has increased factory personnel by 35 per cent; Isaly Dairy Products Co., Mansfield, Ohio, by 50 per cent; Armour & Co. has added 100 men in western Pennsylvania branches.

CANADA probably will have 10,000,000 lb. of butter in excess of requirements this winter. In the United States, butter production is high, stocks are high and movement slow.

NATIONALLY advertised brands of food products continue to gain in popular favor.

ITS BABY FOOD SALES increased 20 per cent during the past year, Gerber Products Co. reports.

CANNED PEA production during 1933 totaled 12,481,008 cases, all sizes. The 1932 pack was 10,117,784 cases.

GREAT WESTERN SUGAR CO. has declared a 60-cent dividend, payable Oct. 2, the first payment made since Oct. 2, 1930, when 35 cents a share was distributed.

CANNING is looking up in England with expected output far ahead of last year. Much success has been attained in canning whole chicken. A factory at Ightham, Kent, is putting out 5,000 cans a day, with the number limited by supplies.

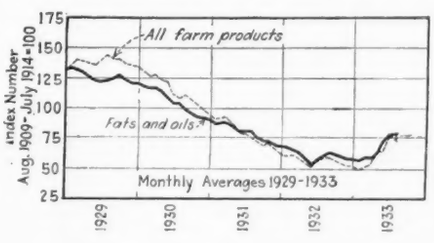
OPEN MARKET PRICES on tomato pulp of good quality are soaring. An offer of $5 per dozen No. 10 cans has been refused by a large holder. This price is not far from the 1924 high of $6.

THE PASTRY BUSINESS of a Pittsburgh baker is 100 per cent better than last year, indicating that the consumer is getting on his feet again.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded September	Total 1933 (thousands)
Bakery Products	$459	$28	$448
Beverages	9,730	9,338	17,387
Canning and Preserving	166	90	341
Confectionery	.....	.....	.....
Grain Mill Products	195	175	1,269
Ice Manufactured	50	303	559
Meats and Meat Products	55	75	441
Milk Products	142	239	1,099
Sugar	80	.....	.....
Miscellaneous	.....	30	980
Total	$10,877	$10,278	$22,524

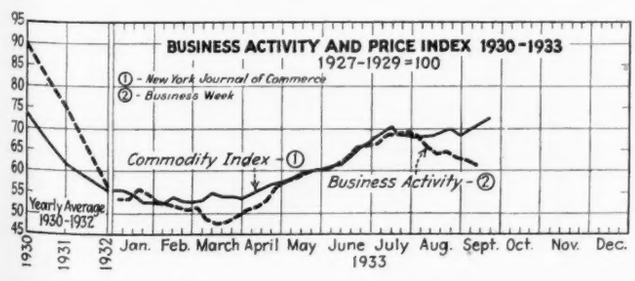
Price Index for Fats and Oils

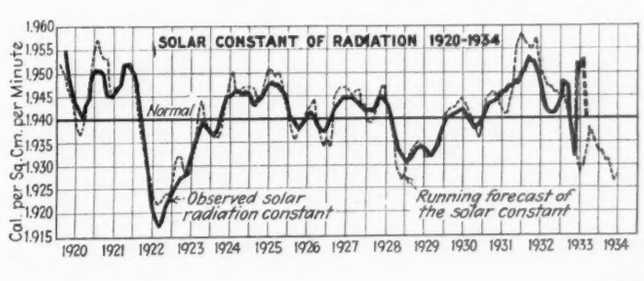


Solar Constant Lower

Despite the fact that the figures observed by the Smithsonian Institution are still regarded as tentative, the mean value for the solar constant in August has dropped to 1.940 calories per square centimeter per minute. During the last ten days of August it was down to 1.931 calories. Recent monthly means follow:

March	1.940	June	1.951
April	1.932	July	1.953
May	1.952	August	1.940

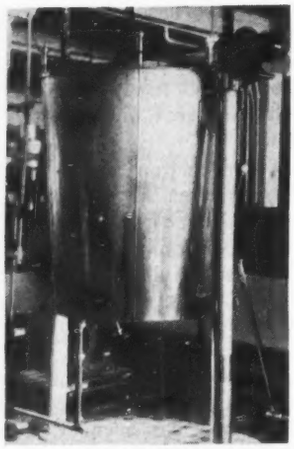




NEW • EQUIPMENT • FOR

Package Filling Machine

Packages containing from a teaspoonful to a pound can be filled with the Whiz-Packer. Built by Frazier & Son, 7 Bremond St., Belleville, N. J., this packaging machine will handle dry materials ranging in size from fine powder to nuts ¾ in. thick. In operation, a conical hopper discharges into cups held in a revolving disk. The cups are collapsible, which permits them to be adjusted to the desired capacity. The machine operates at a speed of 10, 20, 30 and 40 packages per minute; a ¼-hp. motor drives it. To prevent shearing of the product a circular brush guides the product into the cups and roughly levels the contents. The final accurate leveling is done by a straight brush; overflow is automatically returned to the empty cups. An intermittent agitator movement in the hopper gently disturbs the product while the cups are being filled. To clean the Whiz-Packer, the parts to be washed are lifted off without the use of tools. Another feature is that the filling spout is so beveled that it acts as a bag opener.

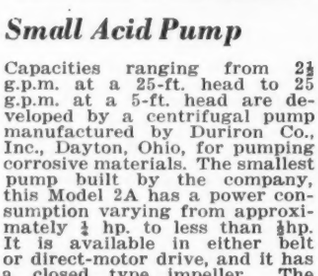


Carbon-Arc Milk Irradiator

To provide a means of introducing vitamin D into milk, Creamery Package Manufacturing Co., 1243 West Washington Blvd., Chicago, Ill., has developed a carbon-arc irradiating machine. The flow surface of the machine is made in cylindrical form, the milk passing in a thin film over the inner surface. The milk feeds at a steady predetermined rate to the distributor at the top of the cylinder, rate of flow being controlled by a positive fixed-capacity pump. A carbon-arc lamp suspended in the center of the cylinder effects irradiation. The lamp operates at 50 volts, with 60 amp. passing across the arc. It is fully automatic, correct amperage being obtained through a current-regulation device built into the lamp control unit. This compensates for any changes in line voltage. The accompanying illustration shows a standard single-lamp unit with a capacity of 4,000 lb. of milk per hour. It requires 3,000 watts.

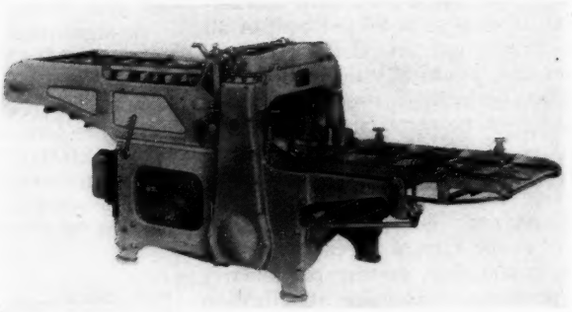
Insulated Steel Beer Barrel

Double-shell, insulated steel beer barrels are being manufactured by Murray Corp. of America, 1424 Aberle St., Detroit, Mich. These containers, made in capacities of 15½ and 7¾ gal., have an outer shell of heavy-gage steel Bonderized and finished with a coat of high-bake enamel. This shell is welded to the inner container to provide rigid construction. The inner shell is formed of two sections of heavy-gage steel, welded together. It is made porous by a Bonderite process so that pitch will adhere tightly. An insulating material fills the space between the inner and outer shells and provides, according to the manufacturer, insulation equal to that of the wood barrel and allowing handling immediately after pitching. Runners formed in the outer shell fit standard conveyors. These also provide reinforcement to the container and protect the bung from damage in handling.



Small Acid Pump

Capacities ranging from 2½ g.p.m. at a 25-ft. head to 25 g.p.m. at a 5-ft. head are developed by a centrifugal pump manufactured by Duriron Co., Inc., Dayton, Ohio, for pumping corrosive materials. The smallest pump built by the company, this Model 2A has a power consumption varying from approximately ¼ hp. to less than ½hp. It is available in either belt or direct-motor drive, and it has a closed type impeller. The pump may be had in various acid-resisting alloys.



Adjustable Bread Slicer

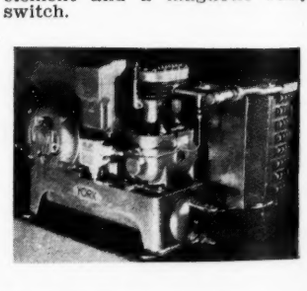
Bread may be cut into slices of any one of four sizes with the Slice-Master manufactured by Micro Corp., Bettendorf, Iowa. To change from one thickness of slice to another, two nuts are loosened and the blade frame is lifted out and replaced with a reserve frame of the desired spacing. The four standard thicknesses provided are ⅜, 7/16, ½ and 9/16 in. The machine is built in two sizes, No. 78 (the one illustrated) being a heavy-duty unit, capable of 24-hour operation at maximum trayless wrapping-machine speeds. The other machine, No. 100, is the Junior power-feed Slice-Master, which synchronizes with wrapping machines having a capacity of 1,600 to 1,800 loaves an hour. Both machines handle loaves up to 18 in. in length. These machines have a completely housed roller-bearing drive mechanism and are dynamically balanced.

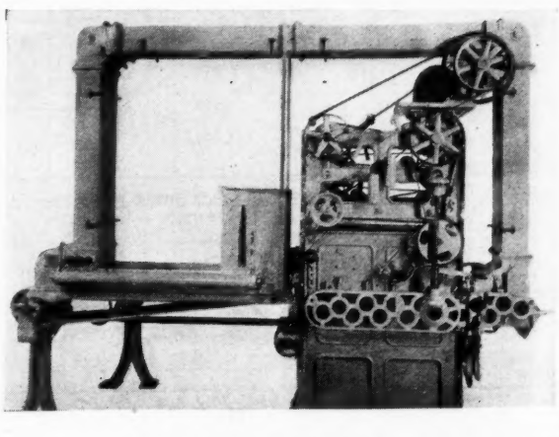
Peanut Cluster Machine

No floor space is required with the Hontz peanut cluster maker distributed by Savage Bros. Co., Chicago, Ill. The machine is mounted on the enrober, yet it is self-contained, no enrober connections being necessary. When not in use, it may be raised out of the way, allowing the enrober to be used for other purposes. The machine is entirely automatic. The peanuts are fed from a hopper through an adjustable measuring valve into a row of spouts and deposited into rings passing underneath on the enrober feed belt. These rings, which are joined together in groups, are held momentarily while the peanuts are deposited. As each group is released, it passes through the enrober and then up an inclined track where the rings are gradually released from the cluster and automatically returned to the point from which they started. The clusters continue through the cooling tunnel. The empty ring groups are electrically heated as they are carried back to be filled again, this allowing the clusters to be released cleanly. The machines are built in three sizes, 16, 24 and 32-in. to fit any enrober. Capacities are 3,000, 5,000, and 7,000 lb. in an eight-hour run. The machine may be obtained with equipment for large individual clusters or patties with centers.

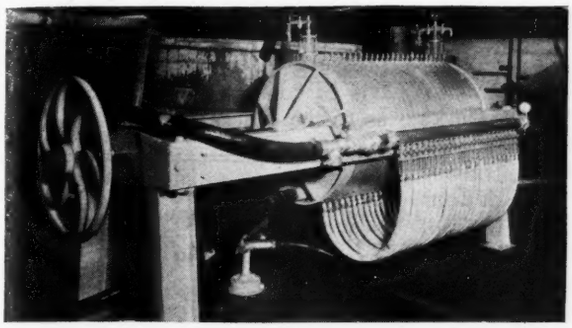
Air-Cooled Freon Condenser

A line of air-cooled Freon refrigerating machines designed particularly to operate at evaporator temperatures up to 45 deg. F. is announced by York Ice Machinery Corp., York, Pa. These units are of 1-, 1½- and 2-hp. capacities. The air condenser of the unit is mounted in front of the compressor and motors, all parts being mounted on a heavy cast semi-steel base. The unit has two fans, one of which is attached to the motor shaft and the other to the compressor flywheel. The latter is a specially designed centrifugal suction fan. A suction pressure switch, with an overload safety device incorporated, controls the unit. The condenser also is provided with gas and liquid stop valves, a fusable safety element and a magnetic relay switch.





FOOD • MANUFACTURERS



Beer Filter

Complete access for thorough, visible cleaning is provided in a kieselguhr filter recently developed for the brewing industry by Zahm & Nagel Co., Inc., 74 Jewett Ave., Buffalo, N. Y. The cloth rings of the filter can be removed intact for scrubbing on both sides; new cloths are installed by removing the external bands which hold them on a rubber ring gasket that minimizes wear. The filter is so constructed that the liquid touches no metal but bronze and copper in passing through it. The plates have individual wheel rollers which run in the channel tracks to make it easy to move the plates and to assure their alignment when the filter is closed. The filter is provided with a bottom discharge, and by the application of gas pressure to the upper body, the liquid remaining in the filter can be removed, thereby preventing waste of filtrate when the filter is shut down for cleaning. A peripheral feed is said to check the speed of the liquid passing across the filter cake, eliminating disturbance of the filtering medium.

Medium-Duty Trucks

Two modifications of existing truck models in the medium-duty class have been introduced by General Motors Truck Co., Pontiac, Mich. One, designated as Model T-33L, has a straight rating of 12,500 lb. with body and payload weights ranging from 5,080 lb. to 7,870 lb. It is powered by the G.M.C. 221 cu.in. valve-in-head engine, developing 69 hp. and 155 ft.lb. of torque. Other variations include a ribbed, cellular type radiator, long-lived single-disk clutch, four-speed transmission, tubular propeller shaft and anti-friction needle-bearing-type universal joints. Four wheelbases ranging from 142 to 184 in. and four body lengths between 9 and 15 ft. are available. The other modified model, Model T-43T, has been designed as a tractor unit, with straight rating of 16,000 lb. and combined gross weight for tractor semi-trailer recommended at 29,200 lb. It uses a 331-cu.in. engine, developing 94 hp. and 230 ft.lb. of torque. The radiator, propeller shaft, universal joints, steering gear and transmission have also been modified.

The Manufacturers ••Offer••

Packaging—Automatic filling, weighing, lining and sealing machinery. Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass. Bulletin No. 1; folder.

Filling and Sealing—"Never-stop" packaging machinery. Stokes & Smith Co., 4930 Summerdale Ave., Philadelphia, Pa. Folder.

Mixing — Double-arm super New Era dough mixers. American Machine & Foundry Co., 511 Fifth Ave., New York, N. Y. Folder.

Refrigeration — Vertical duplex refrigeration compressor. Worthington Pump & Machinery Corp., Harrison, N. J. Folder.

Wood — Characteristics and uses of Lata Balsa. Balsa Wood Co., Brooklyn, N. Y. Booklet; 7 pp.; profusely illustrated.

Pressure Controls — Compensated pressure control instruments. Mason-Neilan Regulator Co., 1190 Adams St., Boston, Mass. Bulletin No. 2000-c; 24 pp.; illustrated.

Paint — Characteristics and merits of Luminall. National Chemical & Mfg. Co., 3617 South Wall St., Chicago, Ill. Booklet; 9 pp.

Oil-Fired Boilers — "Oilbuilt" boiler-burner units. Blueprint of typical unit. Cleaver-Brooks Co., Milwaukee, Wis. Booklet; 5 pp.

Flow Meters—Rotameters for measuring rates of flow of liquids and gases. Schutte & Koerting Co., Philadelphia, Pa. Bulletin No. 18-R; 12 pp.; illustrated.

Steelstrap—Carton strapping. Acme Steel Co., Chicago, Ill. Booklet; 16 pp.; well illustrated.

Tanks—Stainless steel, aluminum and Inconel tanks. Struthers-Wells Co., Warren, Pa. Bulletin No. D-1; folder.

Pumping Machinery—Several types of pumps. Warren Steam Pump Co., Inc., Warren, Mass. Catalog; 16 pp.

Belt Idlers — List prices and dimensions of various Reliance belt idlers. Jeffrey Mfg. Co., Columbus, Ohio. Bulletin No. 569; 11 pp.

Chain Belts—Conveyor chains for glassware, bottles, jars or cans. Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind. Folder No. 1365

Coolers—Bestov standard and de luxe junior coolers. Cherry-Burrell Corp., 427 West Randolph St., Chicago, Ill. Bulletin No. G-210; 8 pp.; illustrated.

Chemicals—List prices for chemicals used in food plants. E. I. duPont de Nemours & Co., Inc., Wilmington, Del. Quarterly booklet; 32 pp.

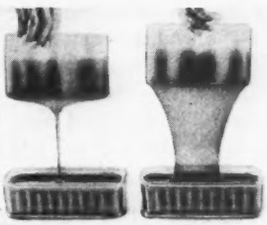
Fans — Electric ventilating fans. Buffalo Forge Co., Buffalo, N. Y. Folder; illustrated.

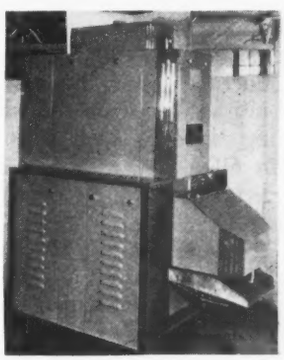
Meters Eliminate Error

There is no error of parallax in reading the new rectangular switchboard instruments introduced by General Electric Co., Schenectady, N. Y. The face of the instrument is recessed below the pointer so that the point is at practically the same level as the scale. Consequently, when viewed from one side it gives the same reading as when looked at from directly in front. There is no chance to see beneath and beyond the pointer, as is the case in instruments with the pointer above the scale.

Sta-Put Lubricants

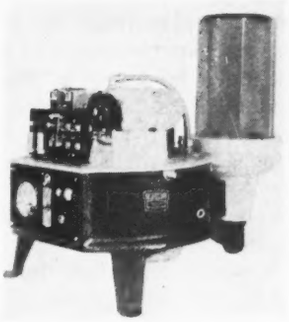
Industrial lubricants which are given a high film strength by a polymerization treatment have been announced by E. F. Houghton & Co., 240 West Somerset St., Philadelphia, Pa. Known as Sta-Put lubricants, the products are made of mineral oil treated under heat and pressure to rearrange the molecules, without changing the chemical content, thereby producing a closer bond between the molecules and an increase in film strength. The test indicates that this increases the film strength by 40 to 65 per cent, the manufacturer states. This causes the oils to cling to the bearing surfaces. Sta-Put lubricants are made in three series and are available for most types of industrial equipment. The illustration compares a straight mineral oil (left) with the same oil after being treated.





"All-Purpose" Coffee Grinder

For the grinding of "all-purpose" coffee in large quantities, Jabez Burns & Sons, Inc., 11th Ave. and 43d St., New York, N. Y., have introduced the Burns No. 23 granulator. This machine employs two pairs of cracking rolls, eliminating the rigid bar. It produces, by "graduated reduction," a granular relationship according to a formula. Pre-normalizing is used for the first time in this machine. It is a method which reduces the chaff to a powder and evenly distributes it through the coffee, this being accomplished without separating the chaff and grinding it separately. The unit is tightly inclosed so that carbon dioxide given off by the roasted coffee fills the interior and excludes atmospheric oxygen. Other attributes are given as cool grinding, simplicity, vertical flow, quiet operation, minimum wear on rolls, elimination of air suction, rapid flow and effective scalping. The capacity of the machine ranges up to 4,000 lb. per hour. A 15-hp. motor drives it.



Electric Eye Measures Hardness

A photoelectric device that automatically tests the hardness of water has been developed by Elgin Softener Corp., Elgin, Ill. This "Hardimeter" is connected to the soft-water supply line, and it samples the water automatically at predetermined intervals. The water passes into a glass cylinder where a small quantity of chemical is mixed with it. If the water is zero hard, no change occurs in either the color or turbidity of the sample. The slightest trace of hardness, however, causes both a turbidity and a change in color, such change being in proportion to the amount of hardness. When the chemical reaction is complete, a beam of light is passed through the test sample and strikes the photo-electric cell. The amount of current generated by the cell is a measure of the hardness of the water, and the degree of hardness can be determined by readings on a meter scale. When the hardness is greater than that for which the instrument is adjusted, a sound or visual signal is given. The instrument also tests the wash water during regeneration of the water softener and indicates when it is again ready for service. The photoelectric water tester is also built with two glass cylinders and two photoelectric cells, so that two samples of the water are taken at the same time. The chemical reagent is mixed into only one of the samples, so that the reading of the instrument is proportional to the difference between the light absorption characteristic of the colored and uncolored samples. This arrangement is used where the water varies appreciably in color or turbidity.

How SPAGHETTI *Is Canned*

(Concluded from page 396)

off and down to each filler, delivering the cans directly in front of the filler, in which position the weighed spaghetti is filled in to them. They are then pushed onto the take-away conveyor belt with very little effort.

The scale should be equipped with a stainless steel scoop into which the spaghetti is weighed and then emptied, with the aid of a funnel, into the can. This method is much more rapid than weighing directly into the can. As the filling and weighing is a piece-work operation in most plants, to obtain an accurate count of the number of cans filled by each filler, a productimeter or automatic counter should be placed on the edge of each filling table in such a position that each filled can, as it is pushed onto the take-away conveyor belt, is recorded.

The amount of spaghetti to be weighed into each can is another point in the process on which no set figure can be placed. The put-in weight question is one that the canner should settle in the same manner as the time for blanching, by preliminary canning experiments. If he has decided that he wants a "wet" finished product, then, for the pound can, he should use from 6 to 6½ oz. of blanched spaghetti. If he desires a "dry" finished product then he should use about equal parts of spaghetti and sauce.

It is very important that the weighing be accurately done. If the filler weighs "too heavy," the sauce, which is filled by displacement, will be proportionately less in amount and the finished product will be too dry. On the same basis, if the filler weighs "too light," the product will be too wet. It is therefore quite necessary that one or two inspectors, depending on the number of fillers, be placed close to the saucing machine where they are in position to inspect the filled cans as they are conveyed to the saucing machine and take off all cans that appear to have too little or too much spaghetti in them. As the filling is a piece-work operation, the fillers are apt to be thinking in terms of speed and may neglect accuracy; hence the necessity for close supervision and inspection of this phase of the work is quite apparent. It is important that the scales be balanced at least once a day and the weights checked. If a beam scale is used, the position of the hanging weight on the beam should be checked three or four times a day, as the filler may without knowing it knock the weight to the right or left and thereby be unconsciously weighing heavy or light.

After the blanched spaghetti has been weighed into the cans they are conveyed to the saucing machine and thence to the closing machine. These operations are purely mechanical and need no description. As the closing machine is equipped to stamp a code-mark on each can, it is a good policy for the canner to do this, so if at any time the question arises as to the date of canning, he will have the answer on the lid of the can.

As the cans come off the closing machine they are stacked solid in retort crates. The cans should be inverted as they are stacked to permit the sauce to mix thoroughly with the spaghetti. The filled crates are then taken to the retorts, where they are processed for 40 minutes, under pressure, at 240 deg. F.

The processing operation completed, the filled crates are removed from the retorts and cooled as quickly as possible. This is done either by total immersion of the crate in a tank of cold water or by hanging the crate under over-head showers. Total immersion of the crate is considered to be the most rapid and most efficient.

The operations so far described pertain to the one-pound can, the No. 300 or 303 size. The filling of the large or No. 10 can requires the same operations, though with slightly different methods of procedure. The equipment for filling and weighing need not be as elaborate as for the small can, but the same general principles should be used. The same factors which set the time of blanching and the amount to be weighed when packing the one-pound can apply to the No. 10 can. It is just as important for the canner to carry out preliminary canning experiments with the No. 10 can as it was with the No. 300 can. Some canners blanch from 20 to 25 minutes; others from 15 to 20 minutes. The amount to be weighed into each can will range from 40 oz. to 50 oz., based entirely on the character of finished product desired. The processing time for the No. 10 can is about 2 hours and 10 minutes at 240 deg. F., allowing about fifteen minutes for the pressure to reduce. The same methods of cooling apply to the No. 10's as to the No. 300 cans.

Queer Things That Happen in Mixing

(Concluded from page 391)

After the maximum of uniformity is obtained, the Rumford company does not permit further agitation of the mixed powder, except that which is unavoidable in the filling machines. The mixers dump directly into hoppers over the fillers. Any subsequent agitation brought about in conveyors may serve partially to unmix the powder and to deliver it to the filler with a lower index of uniformity than it possessed when it left the mixer.

Acknowledgment is made to Ellery L. Wilson, vice-president in charge of production of Rumford Chemical Works, for this interesting information on mixing granular substances.

Other readers who have had unusual experiences in mixing and blending of dry materials are invited to express their ideas on what they have observed.

Preventing Changes in Stored Frozen Foods

(Concluded from page 410)

Since the chemical and enzymic changes occurring during the storage of frozen foods, with the exception of the tendering of meat, are objectionable and must be reduced to a minimum if the products are to be retained in high-class condition, and since these actions proceed more slowly at low temperatures, it is essential that the temperature of the cold storages in which these products are held be not higher than +5 deg. F. if they are to be stored for considerable periods of time. This point should be held in mind in the construction of new cold storages. Moreover, it may be that in the future those interested in the cold storage of food will demand that their products be held at lower temperatures than those employed at present, so that changes occurring during storage will be reduced still further.